

COAL AGE

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The Vicious Circle

BY RUFUS T. STROHM

A playful pup pursued his tail in the midst of a busy street,
Till his tongue hung limp from his gaping mouth and he wobbled on his feet.
The passers-by were stirred to mirth as they watched his exercise,
And they held their sides and they laughed so hard that the tears rolled from their eyes;
And someone yelled: "I like the way that you keep on chasin', pup,
But you're plain damfool, for you're all one piece, so you never can catch up!"

The trainmen wanted a boost in pay,
So they argued loud and long,
And the railroads let them have their way,
For the Brotherhood was strong.
The miners started a husky kick
For the raise they felt was due,
And just as smooth as a juggler's trick
Was the way the thing went through.

The dub that toted the humble hod
Held an upturned palm for more,
The truckman, too, and the white-wing squad
And the rough-necked stevedore.
And after them came the roustabout
And the stokers and the crew—
A crowd with their eager hands held out—
The cook from the galley, too.

The linemen threatened to call a strike,
And the guys that tapped the keys;
They swore: "We'll do it, so help me Mikel!"
And they won their case with ease.
The simple spinners of wool and silk
And the cotton proletaire,
The wagon-drivers for ice and milk
Held off till they got a share.

But since their wages have sought the sky
With a strong and steady trend,
The cost of living's gone up so high
That they're poorer in the end.
Yet still each struggles with might and main
In getting the most he can,
Nor cares a damn for the stress and strain
He puts on his fellowman.

The gods that from elysian fields gaze down on the spinning earth
And see the frantic, scrambling race must be moved to tragic mirth;
And Jupiter doubtless turns to Mars with a dismal smile, to say:
"My word, old top, observe these fools run rings in their silly way!
They're just plain nuts, for the whole blamed bunch forms a body that is one,
And its head won't ever catch its tail, for it simply can't be done!"

Up-to-date Plant of the Buckeye Coal Company at Nemacolin

The plant is not yet completed and probably will not be entirely finished in less than about a year and a half. Indications are that it will eventually be one of the most efficient and up-to-date plants in the world. No expense is being spared on equipment and the construction is of the highest quality

BY DONALD J. BAKER
Pittsburgh, Penn.

SEVENTY-FIVE miles up the Monongahela River from Pittsburgh, Penn., at Nemacolin, is situated the plant of the Buckeye Coal Co. It lies on the west bank of the river, in Greene County, the river dividing Greene from Fayette County at this point. The operation is accessible from the station of Huron on the Pennsylvania R.R. out of Pittsburgh, and thence by ferry to the opposite side of the river.

Eight thousand acres of byproduct coking coal will be available through a 250-ft. shaft. The coal is that of the Pittsburgh seam and runs from 8 to 10 ft. in thickness. The mine is being developed on the rather unusual 15-entry system. The Buckeye Coal Co. is a subsidiary of the Youngstown Sheet and Tube Co., whose main executive offices are located at Youngstown, Ohio.

Construction work on the surface plant, as well as the development of the mine itself, has been going on for some little time. It is doubtful if the plant will have been completed and working to its ultimate capacity of 6000 tons daily much before the spring or summer of 1921. No expense has been spared to make the plant one of the most up-to-date operations in western Pennsylvania. Engineering genius has left the tried and usually practiced methods of the past to the rear. The highest degree of efficiency is being sought through construction and installation that is novel as well as carefully thought out. While considerable of the present equipment is temporary, and the plant is in an unfinished stage, yet a short review of the work that has been completed with some of the plans for the future should prove instructive until such a time as this mine shall have become in actual fact one of the most up-to-date bituminous operations in the world.

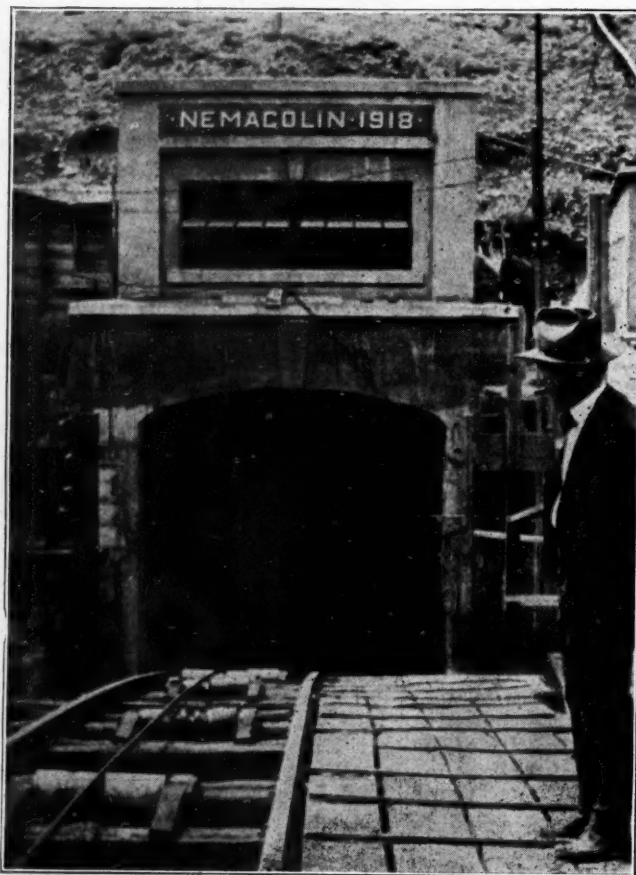
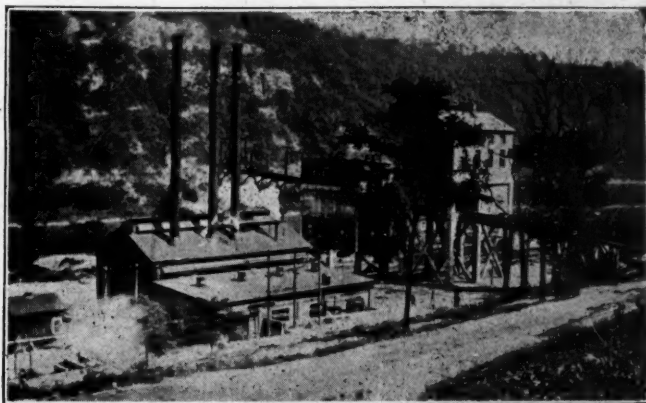
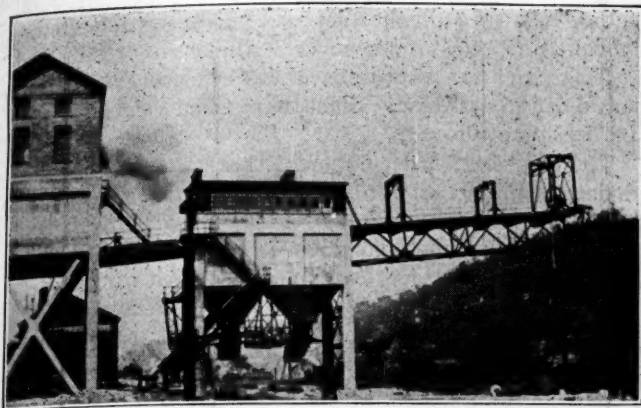


FIG. 1. CONCRETE WALLED ENTRANCE TO THE SLOPE

The coal will eventually be brought to the surface through a 250-ft. concrete-lined shaft. The dimensions of this elliptical opening are 12 ft. 8 in. by 32 ft. Rotary dumps will be installed at the bottom and the coal fed into two skips, the capacity of which has not yet been decided upon but which will nevertheless permit of 6000 tons being brought to the surface in 8 hours. The tippie and hoisthouse have not been constructed but will be similar in design to the type now in use at the slope, of which something will be said later. This shaft will be used exclusively for hoisting the coal to the surface by the skips.

At present some coal is being mined, but only that which is necessary to carry on the underground development and permit of construction work being brought to a like stage on the surface. This coal is being removed through an 850-ft. slope on a 19-deg. pitch, the entrance to which is illustrated in Fig. 1. The slope is concrete walled to the coal and several hundred feet beyond, and is divided into two compartments. The lower of these is 11 ft. wide by 11 ft. high and will eventually be used for the transportation of materials and the removal of slate and refuse exclusively. The upper half is 11 ft. wide by 7 ft. high and is used as a manway. Over 400 concrete steps with 6-in. risers lead to the bottom. The two compartments with their concrete walls are waterproof and electrically lighted. They give the impression of the interior of a large building. At the bottom, concrete arches span the haulageways and are so built that it is not possible for a miner to cross over a haulageway directly. This is a decided innovation and is in strict accord with safety principles.

The tippie and hoisthouse for the slope are illustrated



FIGS. 2 AND 3. GENERAL VIEWS OF POWER-HOUSE, HOISTHOUSE AND TIPPLE

in Figs. 2, 3 and 4, and are of steel, concrete and brick construction. The upper half of the hoisthouse is built of brick and contains a single-drum, Nordberg hoisting engine, built by the Nordberg Manufacturing Co., of Milwaukee, Wis. It is equipped with a C. R. Welch automatic controller which forestalls any accident that might result from carelessness on the part of the operator at the end of the run. The hoist engine is operated by a 2200-volt, General Electric motor.

The lower half of the hoisthouse is of open construction so as to permit of the passage of cars to the tipples.

The cable from the hoist engine runs through an opening in the rear of the hoisthouse, to a carrier pulley on the end of the tipples and thence down through the tipples and under the hoisthouse. The tipples contain an electrically operated, two-car rotary dump, manufactured by the Wood Equipment Co. The small amount of coal that is at present being handled at this tipples is later loaded into river barges. A railroad siding off the Pennsylvania R.R. is now under construction and when completed will be 2 miles long. It will be used in conjunction with the main tipples.

The fanhouse, as shown in the illustrations, is of brick construction and divided into three compartments, the middle of which contains a 6 x 10-ft. double inlet Jeffrey fan with a blowing capacity of 400,000 cu.ft. per min-

ute. The air shaft is concrete walled and 20 ft. in diameter. The compartments on either side of the fan are used as motor rooms. One contains a 220-volt, direct-current Westinghouse motor and the other a 2200-volt, alternating-current Westinghouse motor. The fan is primarily intended to be operated from the alternating-current side. Connections from the fan shaft are made to both motors by means of a friction clutch which automatically puts the direct-current machine into operation in case the alternating-current motor is forced to shut down.

Power is purchased from the West Penn Power Co. for operating certain units of the surface plant. When completed, all of the different pieces of equipment will be electrically operated. At present this is not possible within the mine because of some gas having been encountered. It is believed, however, that by the time the plant is completed and working to capacity the gas will have been sufficiently drained off to permit of a complete electrical installation throughout. Present plans are being made toward that end.

The high-tension line of the West Penn Power Co., carrying 22,000 volts, is taken to an outside transformer station of 500-kw. capacity, where the current is reduced to 2200 volts. Provision has been made at the transformer station to permit of increasing it later to 1500-kw. capacity. Transformers built by the Pitts-

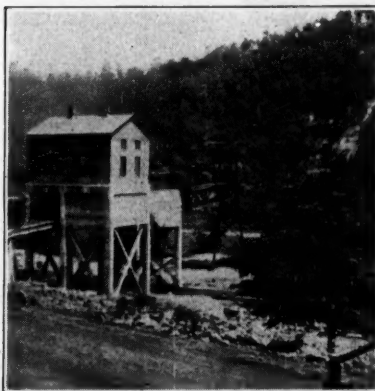
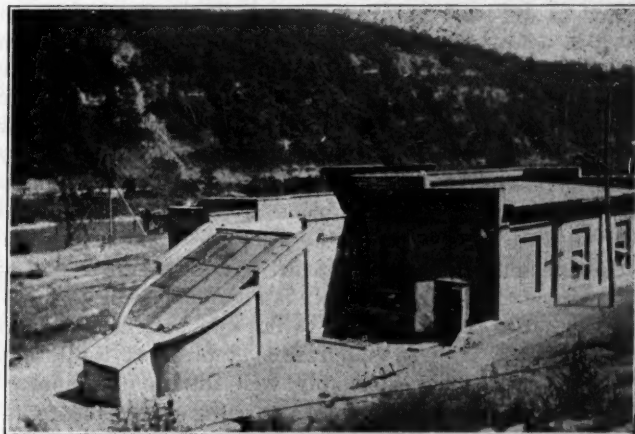
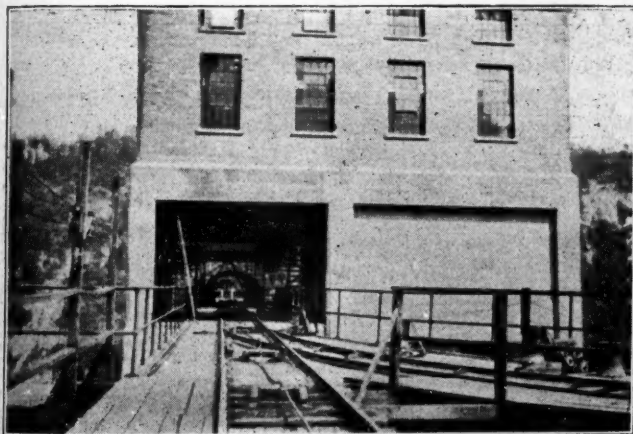


FIG. 4. BIRD'S-EYE VIEW OF HOISTHOUSE AND TIPPLE



FIGS. 5 AND 6. LOOKING TOWARD HOISTHOUSE AND TIPPLE FROM SLOPE OPENING (ROTARY DUMP IN BACKGROUND) AND REAR VIEW OF FANHOUSE



FIG. 7. CONCRETE SEWAGE DISPOSAL PLANT (IN FOREGROUND), TRANSFORMER STATION AND FANHOUSE

burgh Transformer Co. are in use within a picketed inclosure.

A power plant is located adjacent to the slope and contains three batteries of Stirling boilers. It might be mentioned that this power plant is temporary and will be dispensed with as soon as it is considered safe to use electrical equipment underground. A brick partition separates the boiler room from the engine and motor room. A direct-current generator is at present being operated by steam. An alternating-current generator driven by a direct-current motor comprises the lighting apparatus for the mine and town. One Sullivan steam-driven air compressor and one Ingersoll-Rand electrically driven air compressor, both of 2500-cu.ft. capacity, are situated in the room adjoining the boilers and furnish the energy by which much of the present underground equipment is operated.

A pump room is adjacent to the power plant and contains a De Laval electrically driven turbine pump with a capacity of 480 gal. per minute. This machine is operated by a 2200-volt motor. Two emergency steam-driven pumps are at present used as spares. Water for the town and plant is available through five wells drilled to a depth of 150 to 175 ft. These are located at different points around the power plant. Each well is equipped with air lifts, the water flowing from each lift by gravity through a system of piping to the central pool near the pump room. From here it is pumped to water tanks on top of one of the nearby hills and thence flows to either town or plant supply by gravity. The water is excellent in quality and requires no treatment for boiler use. Cast-iron pipe is used throughout in the system of piping.

A spacious machine shop is located to the right of the tippie and is of brick construction. It is at present 80 x 105 ft. in dimensions but can be enlarged later to 200 x 105 ft. An elaborate system of skylights and windows gives a remarkably well illuminated appearance inside. Arrangements are being completed to install a 10-ton crane at an early date. The building contains space for a carpenter shop, tool room, supply room and an electrical equipment supply room. The railroad

siding runs through the shop and makes possible the removal of supplies under cover. Numerous drilling and cutting machines as well as lathes are now in different stages of installation. Some have been completed and are in operation.

The only electrical equipment that has been installed underground is that for the lighting and telephone systems. The coal is at present being cut by Sullivan compressed-air turbine machines. Drilling is also being done by machines operated by compressed air. Forty-four-inch gage track equipment is used throughout the mine. The mine cars are of solid steel, rotary-dump type, with a capacity of 120 cu.ft. Two Goodman articulated storage-battery locomotives are in use on the main haulageways. The later installation of trolley wire will allow for a heavier type of locomotive to be employed, and the present ones will then serve as gatherers. In like manner will electric cutting and drilling machines be installed.

The drainage system in the mine is in an infant stage but will eventually be handled by a wood-lined electrically driven duplex Epping-Carpenter pump with a capacity of 800 gal. per minute. This type of pump is employed at present, but steam-driven. Another machine of the same type will be used as a spare.

The town is located about a quarter of a mile from the plant and reflects the same careful forethought that has been exercised in constructing the plant. It is situated on a hilltop above the mine and commands a fine view of the river and surrounding hills. One hundred and twenty-four houses of the bungalow type have been built, the majority of which are occupied. The designs of the houses are numerous and each is equipped with running water and electric lights, inside toilet, either shower or tub bath, and a laundry room in the basement. As can be seen in Fig. 11, there is not an outhouse in the town.

The houses are of frame construction with a deep brown stain on the weather-boarding caused by a creosote treatment. The walls are plastered and tinted. One of the features of the living room is an attractive open fireplace. The streets are



FIG. 8. END VIEW OF TIPPLE, SHOWING CARRIER PULLEY ARRANGEMENT

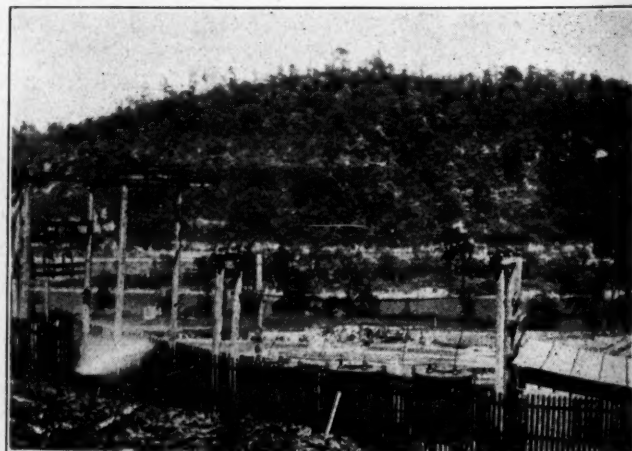
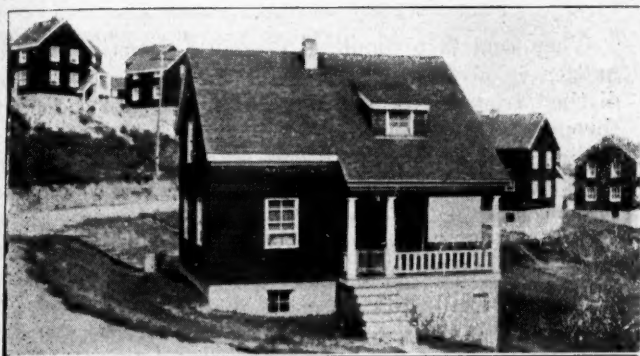


FIG. 9. VIEW OF OUTSIDE TRANSFORMER STATION

laid out to conform to the contours of the hill, which leaves no two houses on the same elevation and produces a staggered effect that is quite different from the ordinary straight-line run of houses found in most mining communities.

The streets are graded and have a firm crushed sand-stone surface. A closed sewerage system is in effect that carries the waste from each house by gravity to a concrete disposal plant located near the fanhouse at the mine. This conforms to state regulations.

At a spacing of 500 ft. apart throughout the town are located small brick and frame buildings that cover a double-outlet fire plug. About 250 ft. of hose is placed in each of these buildings and furnishes adequate protection against fire. A schoolhouse of brick, concrete and stucco construction is nearing completion and is modern in every respect. It is constructed in an E-shape



FIGS. 10 AND 11. GENERAL VIEW OF A SECTION OF THE TOWN AND A CLOSE-UP OF ONE OF THE BUNGALOWS

and conforms to the ground upon which it is built. The rear wings are so designed that an addition can be made when the town has grown to an extent that will demand greater accommodations. Domestic science and manual training are a part of the educational plan.

Protestant and Catholic churches are in different stages of construction. An up-to-date frame hospital is located near the plant and away from the town. This arrangement gives quicker service to any men that may be injured at the mine. A company store is also maintained. The present building used for this purpose is temporary. The completed building will be a combination store and community theater and recreation room. The theater will be used for moving pictures primarily and has a seating capacity of 600. The seats are removable and the room can be thus converted into a place suitable for dancing.

The cars in a certain coal field were reported to hold a ton. In reality, however, they held two or three times that tonnage, though payment was made as for a ton of coal. A newly arrived British miner looked the car over and asked what it held. "A ton," was the answer. "Well," said the miner, "in which corner of the tub shall I 'put' it?"

Ammonia from Coal

BY M. MEREDITH
Liverpool, England

The process of high-temperature carbonization with an efficiency of recovery approaching 80 per cent. can scarcely be said to provide much room for economic improvement. There is, however, one direction from which it is frequently assailed, and that is as regards the yield of ammonia.

The ordinary bituminous coal employed in gasworks contains on an average about 1.5 per cent. of nitrogenous organic matter, which represents a yield of nearly 160 lb. of sulphate of ammonia from each ton of coal, on the assumption that the whole of the nitrogen is recoverable in this form. As is well known, the yield in practice falls far short of the theoretical maximum, the returns of even the largest undertakings showing a recovery of only 26 to 27 lb., or about one-sixth of the quantity represented by the total nitrogen in the coal.

For some years attention has been directed toward recovering a greater proportion of the original nitrogen, but although plants for the generation of low-grade gas are operating successfully in this respect, the conditions under which the increased yield is obtained are scarcely consistent with ordinary gaswork methods. As an instance, mention may be made of the Mond gas system, by means of which an average yield of 96 lb. of sulphate of ammonia is obtained per ton of coal, a quantity which represents 25 lb. of ammonia, equivalent to 65 per cent. of the total nitrogen.

In view of the fact that there appears (in spite of the knowledge gained from war-time research) to be little enthusiasm for synthetic ammonia production on a large scale in Great Britain, and apart from low-temperature carbonization, there remains but one expedient by means of which the ammonia output can be augmented, and that is the possibility of turning to more efficient account the nitrogen of bituminous coals. Fortunately, the modern principles of carbonization appear to be moving in the right direction, for some considerable increase in the recovered ammonia has followed the new general practice of steaming the coal charge in continuously operated vertical retorts.

Details of the working of vertical retorts collected over a considerable period show that, with steaming carried out continuously, the normal yield of 35 gal. of ammoniacal liquor per ton of coal may be enhanced to something between 50 and 60 gal. The reason why this appreciable increase occurs has not as yet been definitely explained, but as ammonia begins to decompose at a temperature of 500 deg. C., and is almost completely broken down if it comes into contact with surfaces at 800 deg., it would seem that the steam, involving as it does an absorption of heat, exercises a cooling action in the retort and also acts as a shield to the ammonia vapors.

In this respect, it may be noted that the continuous vertical retort, unlike the horizontal pattern, is not subject to a stage in the distillation period when the temperature of the charge approaches that of the retort and thus the chief disintegrating influence is eliminated. Again, the work of Tervet and Beilby throws much light on the question. Tervet, in fact, succeeded in obtaining a yield of ammonia equivalent to 57 lb. of sulphate of ammonia per ton of coal, and he showed that if a stream of hydrogen is passed through the incandescent

coke remaining after carbonization, ammonia is formed by combination of the hydrogen with the residual nitrogen of the coke. This work was corroborated by Beilby, who employed a mixture of air and steam in lieu of hydrogen, so that the vertical retort process of today may be looked upon as a partial application to the gas retort of the principles made use of in the manufacture of Mond gas.

A later development which should also assist considerably in augmenting the yield of ammonia is the process of Perkin and West, whereby a stream of moderately low quality gas is passed in at the base of the vertical retort at such a rate as to carry the volatile matter away before degradation has time to occur. Although the method has for its primary object the preservation of the hydrocarbons, there can be little question that it must also reflect on the ammonia, for conditions of a thoroughly shielding nature are introduced, while synthesis is encouraged.

Some extremely interesting results have recently been published by Salmang, who endeavored to increase nitrogen recovery during the gasification of coke by adding chalk or oxide of iron to the bed of fuel in the generator. Varying mixtures of steam and air were passed through the fuel bed, and under the most favorable conditions 59 per cent. of the free nitrogen was recovered as ammonia, a figure which agrees closely with the yield obtained with the Mond gas plant. When, however, 5 per cent. of chalk was intermixed with the coke the proportion of nitrogen recovered increased as high as 96.3 per cent., while with 5 per cent. of oxide and iron added the figure was 70 per cent.

Salmang says that under given conditions of ammonia concentration and duration of heating the rate of decomposition of ammonia in the presence of steam is only about one-eighth to one-twentieth of what it is in a nitrogen atmosphere and without steam. In fact, the yield of ammonia is increased by the presence of steam in conjunction with a considerable excess of air. The effect of lime, too, was to increase the nitrogen obtained as ammonia up to 12 per cent. in the case of coke derived from coal, and up to as much as 100 per cent. when coke derived from peat was experimented with.

EXPERIENCE AT CHELTENHAM GASWORKS

These results are certainly interesting in that they confirm to some extent the experience gained at the Cheltenham gasworks where, by adding a small quantity of lime (about 2 per cent.) to the raw coal before carbonization, it was found that the sulphate of ammonia recovered was augmented by some 2 lb. per ton of coal distilled, or an increase of from 8 to 10 per cent. Unfortunately, so long as gas of the present description is made, it is not possible to arrange for the atmosphere which is most amenable to maximum ammonia output—namely, a mixture of steam and air—while with the air excluded the maximum recovery obtained by Salmang was 20 per cent. less than with a steam-air mixture.

Further interesting work on the ammonia problem has recently been published in Germany by F. Sommer, who says that the maximum yield of ammonia with typical German coals invariably occurs when distillation temperatures between 800 and 900 deg. C. are employed. In contradiction to previous workers, who have shown that with high temperature carbonization about 50 per cent. of the total nitrogen of the coal remains in the coke, this investigator says that the

greater proportion is there retained—namely, up to 79 per cent.

Sommer also corroborates the fact that the presence of steam has a tendency to conserve ammonia, and he accounts for this by suggesting that the ammonia under such conditions is present as the hydroxide (NH_4OH) which is comparatively stable. Moreover, he is of the opinion that the inclined chamber oven is productive of better results than can be obtained with the vertical retort, for the necessary conditions (shortened time of contact with the hot charge through rapid removal of the gas) are more readily obtained therein. A similar advantage is obtained by increasing the size of coke ovens and by lowering the level of the upper collecting flue so as to avoid undue heating of the gas as it passes out. Benzol, in addition to the ammonia, is thereby conserved particularly toward the closing period of carbonization when all the moisture has been driven from the coal. Speaking of moisture in the original coal it may be mentioned that although dry coal is looked upon as essential in the ordinary gasworks process there can be no doubt that, whatsoever the effect of moisture in other directions, it is certainly helpful in the way of ammonia recovery, as is shown by the large increase in this byproduct which is obtained when improperly dried washed coal is used.

FREE OXYGEN IN CARBONIZED COAL

When coal is carbonized a small proportion of free oxygen is always evolved from the coal substance as distinct from that which may be drawn into the retort through ill-fitting floors. The oxygen has a decidedly lowering influence on both ammonia and benzene, which have comparatively low ignition temperatures. Sommer points out that the oxidation of ammonia by air begins at 150 deg. C. and increases in effect with rise in temperature. At 250 deg. 5.86 per cent. of the ammonia is oxidized, although moisture acts as a decided preserving agent. At 450 deg. 12.89 per cent. of ammonia was shown to be lost under dry conditions and 2 per cent. in the presence of moisture. It is interesting to note, however, that sulphuretted hydrogen, which is a primary product of carbonization and which is, therefore, invariably present in the gas mixture simultaneously with ammonia, is oxidized much more readily. It has accordingly a distinct protective action, particularly since—unlike ammonia—its tendency to oxidize is accentuated by the presence of moisture. Sommer found, in fact, that at 100 deg. C. 25 per cent. of the sulphuretted hydrogen was oxidized, and at 425 deg. 95.3 per cent. disappeared; whereas at the same temperatures under dry conditions only 0.26 and 1.48 per cent. was effected. Thus the sulphuretted hydrogen by its more ready action with oxygen tends to conserve the ammonia and prevent its destruction.

Professor Thomas Gray, who is at present in charge of the Fuel Research Station at East Greenwich, has stated that the ammonia formed during the earlier stages of carbonization is evidently a primary product; but as the heat penetrates the charge water still present in the interior is vaporized, and, along with the water vapor which results from the decomposition of the coal, passes through the highly heated and almost completely carbonized outer skin. It is then partly decomposed by the incandescent carbon, with the formation of carbon monoxide and carbon dioxide, while the hydrogen liberated unites with the nitrogen of the coke to form ammonia synthetically.

The production of the secondary ammonia was explained by Tervet, who expressed the opinion that the nitrogen in the coke can be liberated in the form of ammonia so long as the latter is brought into a state of strain which will prevent it from undergoing subsequent degradation. This state is effected by subjecting the ammonia to the superior affinity which exists between the combined nitrogen in the coke and free nitrogen at a particular temperature and in a diluting atmosphere. Thus, during the later stages of carbonization, when hydrogen is being freely evolved, the Tervet reaction comes into play and continues throughout the remainder of the period, though the ammonia which is formed toward the end of the process is, no doubt, decomposed to some extent.

The increased yield of ammonia at high carbonization temperatures is attributable to secondary reactions of this nature, and more especially to the action of hydrogen. It would appear, then, that there are considerable possibilities of augmenting the yield of this byproduct beyond the normal 26 lb. of sulphate of ammonia as at present obtained; and, though the admission of steam to the retort is playing a helpful part, there can be no question that further research in the direction of admitting hydrogen in the form of "stripped" coal gas or blue water gas would lead to the discovery of some interesting information. Some process of this kind would, moreover, be particularly easy of application in gasworks generally.

A Safe Powder Car

BY H. H. HONAKER
Crumpler, W. Va.

Keeping in mind the disastrous explosion of powder that occurred some time ago at Wilkes-Barre, Penn., and wishing to avoid any possible recurrences of such an accident in the operations over which I have charge, I designed and had built at the company shops the safety powder car shown in the accompanying illustrations. This car is employed exclusively for the transportation of explosives in the mines.

The car is built on a standard-gage truck. The sides are of 1-in. oak and the bottom of 3-in. oak. Both sides and bottom are lined with 1-in. tongued and grooved flooring, this lining being raised or separated from the true car bottom by 1-in. strips upon which the lining is laid. The top consists of a "ridgepole" to which is hinged a door upon either side. These doors are built up of an outer layer of planking and an inner layer of tongued and grooved flooring, between which is placed Paroid roofing. The entire top of the car is also covered with this material.

The interior of the car is divided into 36 compart-

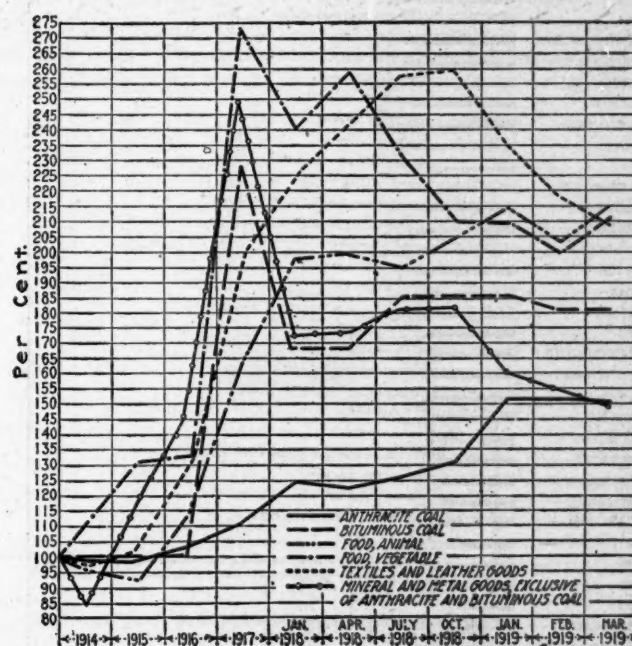
ments, each 11 in. square, for the reception of the miners' powder jacks. At no point can one of these containers come in contact with any metal whatever.

The car is 10 ft. 9 in. long over all and stands 3 ft. 2 in. high above the rail. The inside dimensions are: width, 3 ft. 10½ in.; length, 9 ft. 1 in.; height at eaves, 11 in.; at gable, 19½ in.

Miners are transported to a point convenient to their working places by man trip while this powder car is taken in by a separate locomotive.

Price Movements in War Times

Present-day concern over the cost of living gives point to the official price comparisons, issued from time to time by the United States Bureau of Labor Statistics in its Monthly Labor Review. The bureau gives comparisons of current wholesale prices of 51 commodities in ordinary everyday use with those that obtained dur-

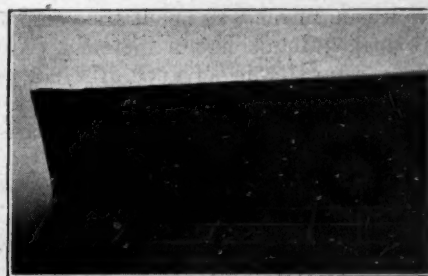
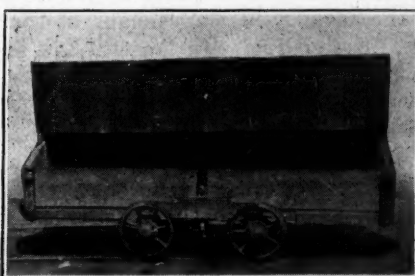


FLUCTUATIONS IN AVERAGE PRICES FROM PREWAR PERIOD TO MARCH, 1919

ing the world war and immediately before it. The latest comparisons issued by the bureau bring the statistics down to Mar. 31.

On the basis of these official Government figures two interesting charts have been prepared. One shows in a graphic way the percentages of increase as of Mar. 31, and the maximum of increases which occurred during the war period, the 1913 prices being the basis of comparison.

Sheep, for example, showed the largest percentage of



OPEN AND CLOSED VIEWS OF A CAR DESIGNED SOLELY FOR THE TRANSPORTATION OF EXPLOSIVES

increase as of Mar. 31, being 167.8 per cent. Sheep reached the maximum of advance in April, 1918, when 219 per cent. is recorded. Wheat was 166.4 per cent. above the 1913 price on Mar. 31, but was as high as 195.4 per cent. in July, 1917.

Food products showing the largest advance were rye and rye flour, 316.4 per cent. and 294.7 per cent. respectively in April, 1918, and both about 150 per cent. over the 1913 price in March of this year. White potatoes, which touched an advance of 286.8 per cent. in July, 1917, have gone back to 63 per cent. Coke was the champion skyrocket, having advanced 491 per

Anthracite, nut size, showed a maximum advance of 51.5 per cent., reached in January of this year, following the wage increase granted to the miners as of Nov. 1, 1918. The only commodities in the list of 51 which have consistently shown, during the whole period, less percentages of advance than anthracite are refined petroleum and gasoline. Their maximums were 47.2 per cent. and 45.8 per cent. respectively in March.

Another chart shows commodities grouped according to vegetable and animal foods; textiles and leather goods; minerals and metals, exclusive of coal; bituminous coal and anthracite. The fluctuations are shown by the averages (not weighted) of the groups, starting with 1913 prices as 100. They are shown by years from 1914 to 1917, by quarters in 1918 and by months in this year.

Vegetable foods showed a declining tendency through 1918 and until February, 1919, but were advancing in March. Market reports and current news accounts would indicate that this advancing tendency has continued during the spring and summer. Animal foods showed an advancing tendency, with two slight recessions, and are continuing to advance. The chart shows clearly the effect of the armistice on mineral products and textiles, and the relatively slight advance in the price of anthracite is seen to follow the advancing trend of wages—increases having been given in May, 1917, December, 1917, and November, 1918. The slight recession, followed by an upward movement in 1918, shows the effect of the 30-cent summer reduction in effect from May to September, and the decline in March, 1919, was due to the temporary disappearance of differential prices during the slump of February and March.

The whole story of the charts is that, with the exception of gasoline and refined petroleum, anthracite has added less proportionately to the increased cost of living than any other commodity commonly used, in spite of the fact that advances in wages and in the cost of supplies has more than doubled the cost of producing hard coal.

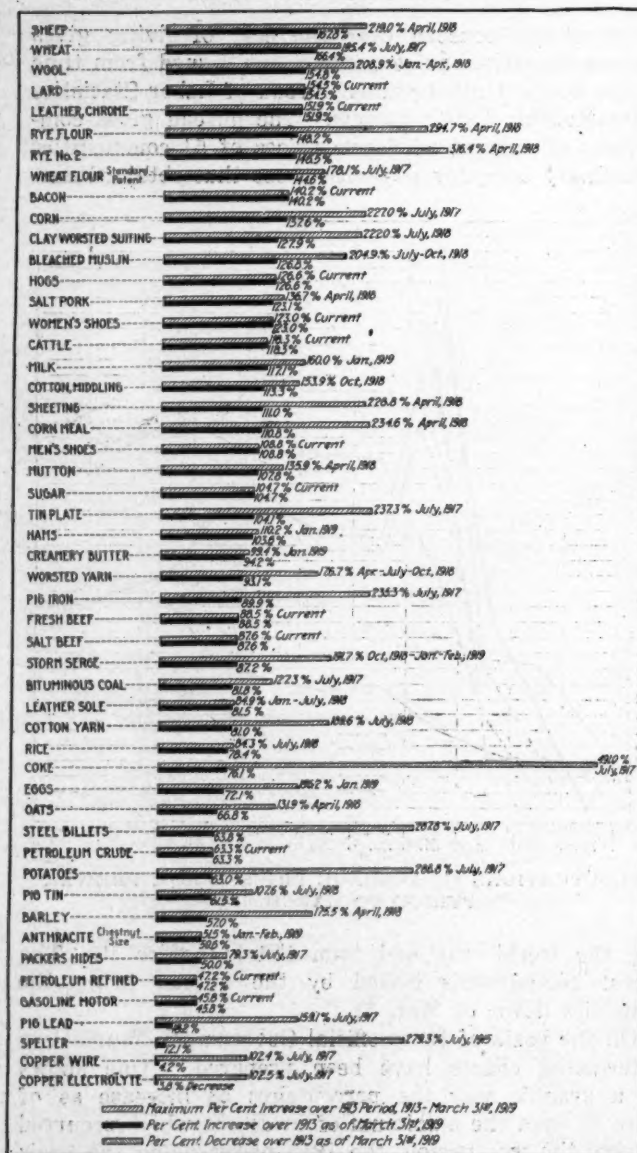
The Real Test of First-Aid Training

BY J. KENVIN
Jeddo, Penn.

First-aid contests are valuable in many ways, yet it seems that the final and best test of a team's training lies in the number of days these men save for their fellow workers through proper care. If through unwise attention a worker becomes infected and loses time from an injury that should have been an easy case, although that colliery team may have won by a perfect score in its field meet, it has failed seriously, after all.

First, last and always, any group of trained fellows should be "first-aid men"; and to be this requires close attention and skill. The tendency among doctors and men who follow first aid as a hobby is toward making physicians of the teams. Some of the questions asked in "meets" are such as would tax a surgeon to answer promptly and properly.

In actual practice in some dark and narrow mine working, all the daylight plans of help go by the board and it becomes a question of getting the injured man to the "bottom" as soon as possible. Thus it would be a fair and just procedure to make the record of actual accidents, days lost, recoveries and deaths form the real basis for judging any team's fitness and the return the employer was getting for training these men.



PERCENTAGE INCREASE IN PRICE OF 50 COMMODITIES

cent. in July, 1917, then dropping back until its net advance in March was about the same as the advance in soft coal. Metals had a meteoric career. Spelter registered a maximum advance of 279.3 per cent. by July, 1915, and dropped back to 12.1 per cent. by March of this year. Steel billets tried to keep pace with coke, and did get as high as 287.8 per cent. over the 1913 level in July, 1917, then coming down to 63.8 per cent. advance in March, 1919. Pig lead fell from its high of 159.1 per cent. to 18.2 per cent., while electrolytic copper, which advanced 102.5 per cent., was 3.8 per cent. under the 1913 price in March.

Experimental-Retort Tests of Orient Coal*

BY R. S. MCBRIDE† AND I. V. BRUMBAUGH‡
Washington, D. C.

SYNOPSIS—*The experiments here described were conducted in order to determine the effect of coking temperature upon the quantity and quality of the coke and gas produced. The results secured are compared with those obtained when using other coals. However, definite conclusions should not be drawn from the data here presented.*

THE Bureau of Standards, in connection with two special coke-oven tests, found it desirable to investigate the influence of temperature of coking upon the quality of the coke produced and upon the quantity and quality of gas made from the coal. Although several quite similar coals were used in the oven tests, the experimental-retort work was limited to coal obtained from the Orient mine of the Chicago, Wilmington & Franklin Coal Co., located at Orient, Illinois. The data obtained from the coking tests with this coal at various temperatures are of such general interest that they are presented here.

A series of five experimental-retort tests was made at various temperatures. The coking was done in a cylindrical retort of cast iron, set up as shown in Fig. 1. This apparatus was made available to the Bureau through the courtesy of the Bethlehem Steel Co., Sparrows Point, Md., which has used this equipment regularly for trying out coals or mixtures of coals intended for its byproduct coke ovens. Data of a few similar retort tests on a variety of other coals which have been tested at this plant are presented for comparison.

APPARATUS AND METHOD USED

The cylindrical retort, shown in Fig. 1, was inclosed in a refractory-brick setting approximately 3 ft. in each dimension. It was heated by a large bunsen-type burner, using coke-oven gas. The sample of coal to be tested was pulverized and dried thoroughly, generally by allowing it to remain over night in an oven at approximately 100 deg. before introduction into the small cast-iron box used to hold the charge. The retort was heated up to a temperature from 60 to 100 deg. C. above the temperature desired for the test in order to allow for the unavoidable rapid cooling that takes place when the lid of the retort is opened for introduction of the charge. Immediately after each charge was placed in the retort an oil soaked rag was thrown in. This rag quickly took fire and exhausted the oxygen in the retort space, thus eliminating the possibility of an explosion as the gases from the coal were generated.

The temperature of the retort was maintained at the desired point according to the indications of thermocouple T_1 , the location of which is clearly shown in Fig. 1. Thermocouple T_2 furnished auxiliary temperature readings, but these were not used as the basis for temperature control. After introduction of the charge the lid was quickly closed and mudded up to prevent gas

leakage. The gas driven off from the coal was discharged from the retort through the outlet pipe shown in the figure. As soon as the gas from the coal began to appear at a purge cock in this line, this purge cock was closed and the gas allowed to flow into a small storage holder in which the entire volume generated from the charge was collected. During the test period record was taken at intervals of 5 min., showing temperatures of T_1 , T_2 , the volume of the gas collected in the holder, and the temperature of this gas. When the charge ceased gassing the coke was removed and quenched, and a record made of the barometric pressure and of the temperature and volume of the gas in the holder.

After quenching, the coke was examined thoroughly, a description recorded, and an average sample prepared for analysis. The gas collected in the storage holder was analyzed, the candlepower and specific gravity de-

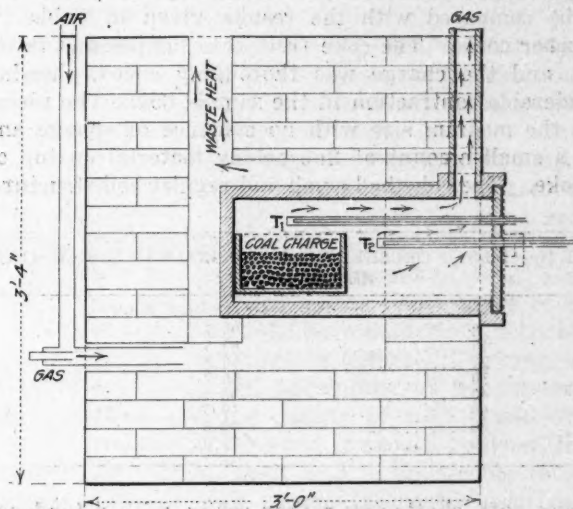


FIG. 1. EXPERIMENTAL RETORT

termined, and the heating value calculated from the analysis. From these data were calculated the B.t.u. in the gas per pound of coal carbonized, the cubic feet of gas per pound of coal, and the candle-feet per pound.

The coal used for four of these tests was that remaining from the sample taken at St. Paul, Minn., when the Bureau tested the coke plant of the Minnesota By-Product Coke Co., using Orient, Ill., coal. For the fifth test there was another smaller sample remaining from another shipment of Oregon coal used by the Bureau in a separate coke-oven test at Dover, Ohio. Table I gives the analysis of these coal samples as used in the retort tests. These analyses agree closely with those of the carefully prepared samples analyzed by the Bureau of Mines in connection with the plant tests mentioned above. The results of these tests, therefore, can be regarded as typical of the results for the larger shipment. Table II shows the size of the coal as crushed for the retort test.

The results of the five retort tests are given in Table III. In considering these data it must be borne in mind that only a limited number of tests could be made because of the small samples and the short time available for the work. One should be careful, therefore,

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TABLE I—ANALYSIS OF ORIENT COAL AS USED IN EXPERIMENTAL-RETORT TESTS (DRY BASIS)

	Sample from	
	St. Paul, Minn.	Dover, Ohio
Volatile matter.....	37.8%	38.0%
Fixed carbon.....	52.3%	53.4%
Ash.....	9.9%	8.6%
Sulphur.....	0.87%	1.47%
Phosphorus.....	0.007%	0.002%
Total carbon.....	73.0%	76.3%
Hydrogen.....	5.1%	5.3%
Oxygen.....	9.9%	8.5%
Ratio: Hydrogen-oxygen.....	51.6%	62.6%
B.t.u. per lb. (dry).....	12,800	13,000
B.t.u. per lb. (dry and ash-free).....	14,200	14,200

not to try to draw too many conclusions from these results.

Test No. 1 was made as nearly as possible to duplicate the usual temperature conditions of testing followed by the Bethlehem Steel Co., so that a basis for comparison of this coal with others would be available. In this particular test the gas for heating the retort was cut off completely 40 min. after the introduction of the charge. The data from this test are the only ones which can be compared with the results given in Table IV for other coals. The coke from this sample was fairly good, and the charge was thoroughly coked, showing considerable contraction in the sample box. The pieces were the medium size with no evidence of sponge and only a small amount of fine pebbly material on top of the coke. The coke had small and regular cell structure,

TABLE II—SIZES OF CRUSHED COAL AS USED IN EXPERIMENTAL-RETORT TEST

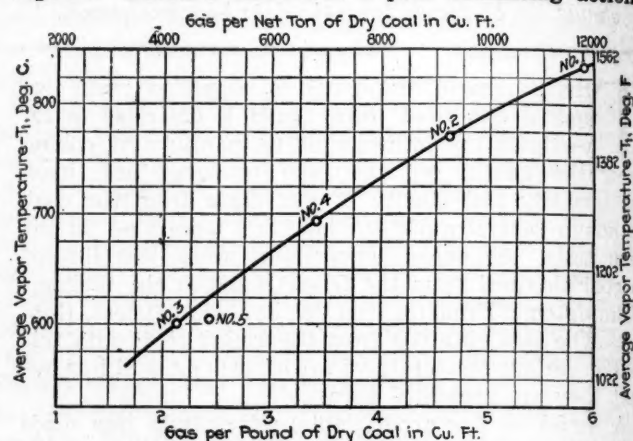
Mesh	Percentage Through Sieve
8	99.7
10	89.5
20	50.8
30	36.7
40	30.3
60	19.3
80	13.3
100	11.0

but was soft, shattering rather easily, with a tendency for longitudinal fracture, but no distinct cross-fracture. It was light in weight and of a dark silver color.

Test No. 2 was made at as nearly as possible constant vapor temperature (T_1) of 775 deg. C. This was approximately the average temperature of the vapor above the coal as recorded in the test of the coke plant of the Minnesota By-Product Coke Co., St. Paul, Minn., when the coking time was approximately 19 hr., but it is probable that for the same temperature of retort as of oven the vapor temperature in the retort would be higher than the corresponding vapor temperature in the oven. The coke results obtained in this case should probably, therefore, be more nearly comparable with the results of special oven tests made at St. Paul when coking time was approximately 25 hr. The coke from this test was fair, contracted in the box and broke up into large pieces with no sponge and only a small amount of fine material about $\frac{1}{8}$ in. thick on the upper surface of the mass. It had small and slightly irregular cell structure; but as a whole the coke was clean, soft, and somewhat tougher than in test No. 1, with longitudinal fracture but no cross-fracture. It was slightly heavier than the material from test No. 1 and of dark color.

Test No. 3 was made with the idea of obtaining results at a somewhat lower vapor temperature above the coal than the average prevailing in the St. Paul test,

but higher than noted in the other tests made by the Bureau at Dover, Ohio, where the vapor temperature above the coal averaged about 550 deg. C. It was attempted to maintain an average throughout for T_1 of 600 deg. C., and the results correspond closely to this temperature. Judged by the results of this test, the coal would normally be characterized as only semi-coking at this temperature, for the coke was quite poor. There was some contraction in the box and no sponge formed, but there was a large amount of loose material, which appeared almost uncoked, on top of the larger pieces of coke. The cell structure was small and highly irregular. Because there was a poor cementing action,

FIG. 2. RELATION OF GAS YIELD TO VAPOR TEMPERATURE T_1 FROM EXPERIMENTAL RETORT TESTS

even the large pieces were soft and easily broken in the hand. The material was fairly heavy, with decided longitudinal fracture and no marked cross-fracture. The color was extremely dark.

For Test No. 4, in view of the poor results judged by the character of the coke obtained in test No. 3, it was decided to conduct this test at a somewhat higher temperature. The effort was to maintain T_1 constant at 700 deg. C. throughout this test. Even at this temperature the coal would be characterized as semi-coking, although the coke was superior to that in test No. 3. It showed contraction in the sample box, large pieces, and

TABLE III—EXPERIMENTAL-RETORT TESTS OF ORIENT COAL

Test number.....	1	2	4	3	5
Date.....	Jan. 14, 1919	Jan. 15, 1919	Jan. 17, 1919	Jan. 16, 1919	Jan. 18, 1919
Temperature average T_1 , (deg. C.).....	840	775	700	600	605
Weight of dry coal (lb.).....	4.48	4.00	4.00	4.00	3.20
Gas generated (cu.ft. at 30 in. 60 deg. F.).....	26.3	18.5	13.6	8.5	7.8
Gas per lb. of dry coal (cu.ft.).....	5.87	4.62	3.40	2.12	2.44
Gas per net ton of dry coal (cu.ft.).....	11,750	9,250	6,800	4,250	4,850
Candlepower of gas.....	5.4	10.0	12.2	15.7	15.9
Candle-feet of gas per lb. of dry coal.....	31.7	46.2	41.5	33.3	38.8
Specific gravity of gas.....	0.465	0.510	0.625	0.660	0.655
Analysis of gas: CO_2	4.7	5.1	8.2	7.2	8.2
O.....	1.0	1.3	1.0	0.8	1.6
III.....	2.2	3.1	3.8	5.0	5.2
CO.....	17.3	13.6	11.3	8.1	8.3
CH_4	25.1	30.6	36.6	37.1	39.5
H.....	46.3	44.7	33.6	30.3	26.0
N.....	3.4	1.6	5.5	11.5	11.2
Heating value, calc. from analysis					
B.t.u.	510	570	600	610	625
B.t.u. in gas per lb. of dry coal.....	3,000	2,630	2,040	1,300	1,520
Coke formed: Large (lb.) dry.....	2.99	2.66	2.79	2.72	2.19
Loose material (lb.) dry.....	0.04	0.06	0.17	0.21	0.19
Total (lb.) dry.....	3.03	2.72	2.96	2.93	2.38
Coke yield: Large (per cent of dry coal).....	67.0	66.5	70.0	68.0	68.5
Loose material (per cent of dry coal).....	1.0	1.5	4.0	5.0	6.0
Total (per cent of dry coal).....	68.0	68.0	74.0	73.0	74.5
Coke analysis (dry basis):					
Volatile.....	5.3	7.1	7.1	11.5	14.0
Fixed carbon.....	80.2	79.1			74.2
Ash.....	14.5	13.8			11.8
Sulphur.....	0.78	0.78			1.23
Phosphorus.....	0.014	0.014			0.004

TABLE IV—EXPERIMENTAL RETORT TESTS OF OTHER COALS

Data Furnished to Bureau of Standards by the Bethlehem Steel Co. All Tests 4.48 lb. at Approximate T_1 , Average of 850 deg. C.									
Date.....	May 11, 1918	Sept. 18, 1918	May 16, 1918	May 10, 1918	May 10, 1917	Dec. 6, 1917	May 8, 1917	Feb. 11, 1917	
Coal.....	40% Wash- ington 60% Quema- honing	50% Gauley 50% Poca- hontas	Washington	Quemahoning	Morrell, Fay- ette County, Penn.	Logan County, W. Va.	Mt. Pleasant, Fayette County, Penn.	Tip Top, Fayette County, Penn.	
Coal Analysis: Volatile.....	25.42	28.85	33.02	17.23	31.20	26.08	31.55	30.63	
Fixed carbon.....	66.58	63.98	58.51	75.45	57.80	45.95	59.86	59.07	
Ash.....	8.00	7.17	8.47	7.32	11.00	27.97	8.59	10.30	
Total carbon.....	79.63	79.69	77.78	83.15	72.26	59.77	72.45	70.71	
Hydrogen.....	4.72	4.85	5.05	4.48	4.30	3.82	4.41	4.16	
Oxygen.....	6.35	7.05	7.40	3.75	11.01	7.14	13.25	13.63	
Ratio: H/O.....	74.33	68.79	68.24	119.46	39.05	53.50	33.27	30.52	
Gas per lb. of coal (cu.ft.).....	4.50	4.55	5.10	4.50	5.17	3.49	5.02	4.08	
Gas per net ton of coal (cu.ft.).....	9,000	9,100	10,200	9,000	10,340	6,980	10,040	8,160	
Candlepower of gas.....	8.0	6.2	8.5	3.7	1.2	10.6	2.6	2.3	
Candle-feet of gas per lb.....	36.0	28.2	43.3	16.7	6.2	37.0	13.1	9.4	
Specific gravity of gas.....	0.400	0.476	0.440	0.424	0.450	0.466	0.495	0.551	
Analysis of gas: CO ₂	3.1	4.5	4.1	2.3	5.6	4.4	8.0	10.8	
O ₂	0.9	0.5	0.7	0.8	0.6	0.6	0.4	0.7	
H ₂	2.5	2.0	2.6	1.6	1.4	3.1	1.9	1.6	
CO.....	10.4	12.6	11.7	9.9	15.6	8.6	15.5	14.6	
CH ₄	29.3	31.5	30.8	27.0	21.5	35.0	24.0	26.5	
H ₂	52.8	46.8	47.5	57.0	51.1	46.1	48.4	42.7	
N ₂	1.0	2.1	2.6	1.4	4.2	2.2	1.8	3.1	
Heating value calc. from analysis (B.t.u.).....	557	556	561	526	465	600	492	490	
B.t.u. in gas per lb. of coal.....	2,510	2,530	2,860	2,370	2,410	2,090	2,470	2,000	
Coke obtained.....	Extra good*	Good*	Fair*	Good	Semi-Coking Coal	Semi-Coking Coal	Non-Coking Coal	Non-Coking Coal	
	Shatter Test 80%	Shatter Test 66%	Fingery Sponge Shatter Test 52%						

* These results refer to coke from full-size oven tests.

no sponge; but there was a large amount of loose and apparently uncoked material on top of the coke. The small and somewhat irregular cell structure, with soft friable material resulting from a poor bond, corresponds to what would be expected from the results of previous tests. The material was fairly heavy, with typical longitudinal fracture and no cross-fracture, indicating that at this temperature there was a decided tendency to secure blocky coke rather than that of a fingery shape. As in the previous test the material was dark in color.

Test No. 5 was run with a small sample of coal remaining from the Dover test, in an effort to duplicate the conditions of test No. 3, namely an average for T_1 of 600 deg. Although this coal came from an entirely different shipment from that used at St. Paul, the results were almost exactly the same as from the test No. 3, made at the same temperature.

By comparison of the results for the five tests, the large influence of temperature of coking upon the quantity and quality of gas is evident. In Fig. 2 is shown graphically the change in quantity of gas per pound of coal carbonized with changing temperature. In this connection it should be noted that the higher temperature results represent not only a more complete elimination of the volatile material from the coal, but also a decomposition of the heavier volatile material into the gaseous constituents. Naturally, as the vapors leaving the coal are subjected to this greater decomposition at higher temperature, the average heating value of the gas is diminished. This diminution of heating value per cubic

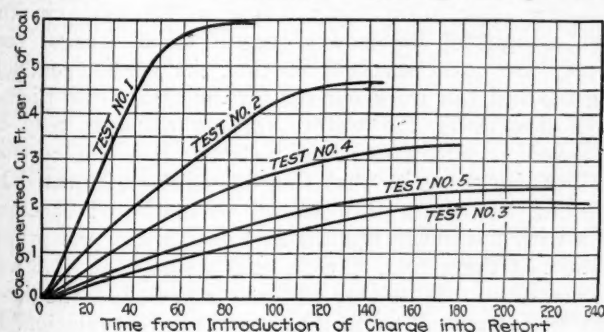


FIG. 3. GAS GENERATED IN EXPERIMENTAL-RETORT TESTS.

foot is, however, by no means enough to offset the effect of the larger volume, as is shown by the fact that the B.t.u. in the gas per pound of coal carbonized at 840 deg. is almost double that at 600 deg.

Fig. 3 shows the influence of temperature upon the rate at which the gas is generated and, of course, also the influence of temperature upon the time required for complete gasification of the charge.

As would be expected, the amount of volatile matter left in the coke decreases as the temperature of coking increases; and correspondingly with more volatile matter in the coke the yield is higher. However, at the lower temperature the percentage of fine material is much greater and the quality of coke much inferior. In this connection, however, it should be noted that in none of the coking tests was it practicable to secure temperatures as high as are frequently used in oven practice with coals that are regarded as specially suited to the production of metallurgical coke. If such higher temperatures had been used another influence noted in connection with the St. Paul test would probably have appeared, namely, that at the high temperatures there is great tendency for the coke to be brittle, fingery and small, instead of fairly tough and blocky.

As pointed out above, great care should be exercised in drawing the conclusions from these few tests. However these few conclusions are strong confirmation of the results of the special oven tests made at St. Paul and are, therefore, a valuable bit of supplementary data, which it is hoped will be of interest to the byproduct coke-oven operators in general, but most especially to the operators who use Mid-Continent coals.

For sake of comparison there are included in Table IV data for other coals similar to the data given in Table III for the Bureau's tests of Orient coal. A general comparison of these data is interesting, but no detailed conclusions should be drawn, as comparison of such single tests is apt to be misleading.

AN OBJECTION to the use of powdered coal as fuel is that none of the byproducts is saved in this method of combustion. Some processes which include a saving of part of the volatile matter before the fuel is pulverized for use in that form would have conservation advantages.

Some Boiler-House Economies

BY E. P. HUMPHREY
Lehigh, Penn.

SYNOPSIS—*In the economies effected at many collieries in recent years the boiler house has been often neglected. The amount of coal consumed for power purposes is often underestimated as increased load is frequently lost sight of. A carefully conducted test will in many cases rectify existing errors and point the way to greater efficiency in operation.*

THERE have appeared in *Coal Age* lately some highly interesting articles and discussions on the subject of fuel conservation in general, and the great waste of our natural resources not only in their production but for power-generating purposes. In looking over the various tonnage reports for the anthracite field one can find that about 12 per cent. of the coal prepared for shipment is consumed by the colliery plants for power, principally in making steam. In many cases the quality of the fuel burned at the colliery is poor, and this material would not find a ready market; but more often this is not the case.

At the present time much stress is being brought to bear upon the operator concerning his costs. The various operations in and about the mines have been speeded up and made more efficient because of the advent of electrically operated mining machinery. The breaker and outside forces have been trimmed down, machinery replacing much manual labor, but as is often the case the boiler house has been untouched. One of the reasons is that few, if any, plants have reliable knowledge of the amount of coal consumed. This is generally estimated, and the amount thus determined is used for each month, winter and summer, regardless of any change in the load.

IGNORANCE OF TRUE OPERATING CONDITIONS

In this regard it may be of interest to relate a somewhat amusing instance of this very thing. A suspension was coming at an anthracite colliery and enough fuel, as estimated, was stocked to tide over the shut-down. All went well until the time had about half passed, when the supply was exhausted. No doubt when the fuel had been estimated originally it was nearly correct, but the increases in load had not been considered. This opened the eyes of the officials, who later ran some complete tests in order to ascertain the true operating conditions.

On the other hand, it seems as if there was a great mystery connected with the operation of a boiler plant. It is not uncommon in the ordinary colliery plant, when the fuel is muddy or inferior, for the steam pressure to go down. The bosses then start "yelling" at the firemen, causing them in some cases to "walk out," making much trouble. Many operators will dodge the boiler plant and let it worry along, believing that by letting it alone they keep out of trouble. Furthermore, they frequently give the firemen better coal than is really necessary, in order to keep them quiet and on the job.

The economic standing of a boiler plant may be had

from the simple relation of the water evaporated per pound of coal as fired. This is not a difficult ratio to find, and in the following discussion it is the intention to show how simple and easy it is to determine this relation, what it should be and, if not, how to find and remedy the losses without too much theoretical detail.

Theoretically, one should get about 15 lb. of water evaporated, "from and at," per pound of coal, but this has never been done. With good coal and boiler conditions, 8 lb. has been the highest I actually know of for a hand-fired furnace. I was present at the test giving this result and which lasted 7 days. The coal contained the following sizes: Pea, 0.50 per cent.; buckwheat, 19.47; rice 18.96; barley, 43.77, and No. 4 buckwheat, 17.30 per cent. By analysis the coal had a heat value of 12,357 B.t.u. per pound. The ash as withdrawn from under the grates contained 25 per cent. fixed carbon. The sizing of the coal was as follows: $\frac{9}{16}$ in. for pea, $\frac{5}{16}$ in. for buckwheat, $\frac{1}{4}$ in. for rice, $\frac{3}{32}$ in. for barley and $\frac{1}{16}$ in. for No. 4 buckwheat, all round-mesh screens. The coal was clean and fired wet, carrying on an average of 7 per cent. hygroscopic moisture.

AVERAGE EVAPORATION IN HAND-FIRED FURNACES

The average evaporation in ordinary colliery work for hand-fired furnaces is from 3 to 5 lb. of water per pound of coal, with some plants working below this and some going above it. A great variety of conditions affect this result. In many cases the boiler plant receives less attention than any other aggregation of equipment at the colliery.

If the operator is to know whether his plant needs attention, he must make a fair test of the amount of coal burned and the water evaporated for a period of not less than 24 hours. This is the first and, you might say, the rough test. If the plant is larger than 1000 hp., this will mean some extra help to weigh the coal. If no other means are at hand, this can be done by cleaning the floor in front of the boilers and having the weighers load the coal in boxes or wheelbarrows, the tare being known, and dumping the coal in this cleared space, always keeping sufficient fuel at hand for the firemen, so that there will be no delays with consequent keeping of the fire door open.

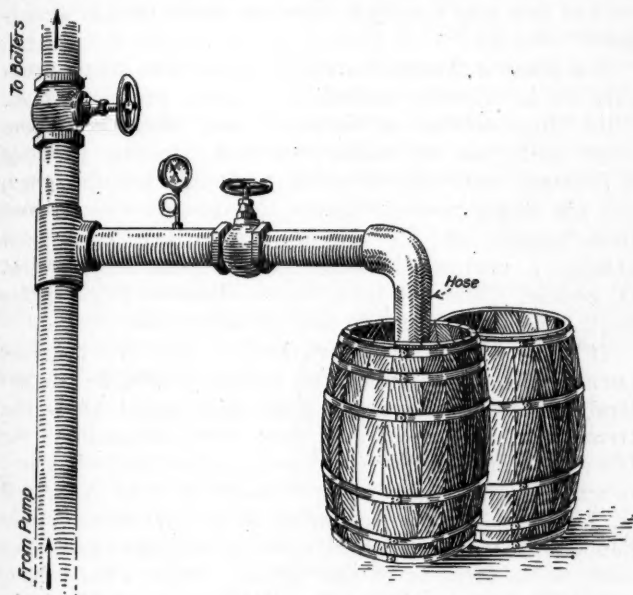
Some have found it convenient to use a box of known capacity, which is always filled level full before dumping. This method is not exactly accurate, as the coal will lose from 3 to 6 per cent. of its moisture after standing over night, thus making a difference in the true amount of material as fired. Conditions of coal supply are quite variable, so that the person conducting the test can work out his own method from them.

In measuring the water, various methods may be followed. Some plants are metered, but the best of meters slip some, so that they should be calibrated by running the water into known volumes and checking this with the meter reading and then using the proper factor. Others may have a convenient tank that can be measured. If neither of these is available, the pump can be calibrated, as to its capacity per revolution, by throttling its discharge so as to make the pressure the same as the boiler pressure, measuring the quantity

pumped, and carefully noting the number of revolutions. Then, when testing, a revolution counter may be used. The piping arrangement will be about as shown in the accompanying diagram.

The level of the water in the gage glasses should be marked at the start and the feed should be so regulated that at the finish of the test it will be at the same level. At plants where there are several fires to be cleaned that cannot be cleaned at the same time, it is best to start the test between cleaning periods. The thickness of the fuel should be measured at the start and at the finish, and if not the same the difference estimated.

In a test of this sort the operator wants the true operating conditions and for this reason should have a dependable person on hand to guard against any faking. In one instance in a plant consisting of four batteries, a fuel consumption test only was run. Believing that the consumption of each set was identical,



PIPING ARRANGEMENT FOR MEASURING WATER

even though of different makes of boilers, the test was run on only one battery. The final result for the entire plant was to be four times this unit's consumption. As it happened, in this case the firemen had been dissatisfied and wanted more money, so they forced this one battery and ran the total consumption up tremendously high, thus adding to their argument for a wage increase in consideration of the amount of coal they fired. A fuel-consumption test alone shows nothing as to the operating conditions. As mentioned above, the water evaporated in relation to the fuel burned is the true index. A sample of the ashes should be washed with water and its appearance noted. If possible, it should be analyzed.

The amount of water evaporated per pound of coal may be far from satisfactory. In such a case a real investigation should discover the trouble and show how to rectify it. A small sample of the coal from each barrow or box as fired should be placed in an air-tight container and the entire sample thus secured and analyzed. Frequently a large percentage of hygroscopic moisture is present. This water must be evaporated and the resulting steam superheated to the flue temperature. The heat loss for each 1 per cent. of moisture figured on coal of 13,000 B.t.u. thermal content is

nearly one-tenth of 1 per cent., and it is not uncommon for colliery boiler fuel to run from 10 to 15 per cent. moisture. For the fine coal, which has often a tendency to cake, this moisture aids the combustion mechanically by tending to break up the fuel bed.

The ash content of the coal is the most important consideration next to the calorific value. Ordinary boiler coals generally carry from 18 to 25 per cent. of ash. This means that the heat value is cut down to about 75 to 85 per cent., besides the greater liability of clinking and clogging the fuel bed, the higher drafts required and the additional expense for the ash disposal.

A large per cent. of unburned carbon may be present in the ash, and generally this runs from 5 to 25 per cent. The reasons for this may be the poor quality of the coal, poor condition of the grate bars, or forcing the fire too hard as well as careless cleaning of the fires, the fuel either not being sufficiently burned before cleaning or too much attention being given to shaking the grates and slicing. I have noticed also that when firing of fresh coal is performed over the pile of ashes that have just been pulled out of the furnace, that considerable loss is caused by the coal spilling from the fireman's shovel onto the ash pile.

The quality of coal burned is sometimes of the poorest. It may not have the culm all washed out, or if there is some stripping or river coal in it there may be considerable sand present. In one case where coal was carried to a small isolated steam plant having two return tubular boilers and where the fireman was the ashman, it was found that 4 tons of No. 1 buckwheat were required instead of 14 tons of Nos. 2 and 3 buckwheat, giving much better steaming with less ashes, this consideration alone saving the services of one man. Thus in certain cases it pays to use a high grade of fuel.

SIZING OF FUEL IS IMPORTANT

The sizing of the fuel is an important factor. Coal of uniform size burns with less draft on account of not packing. High drafts make blow holes, causing a tremendous waste of heat through the heating of all the excess air. I have found with hand-fired furnaces with stationary grates that far better results were obtained by not forcing a boiler beyond its rating. For example, in a 1000-hp. plant of four 250-hp. units, less coal was fired and less ashes made than when running on three boilers at 133 per cent. rating. In the latter case more coal was fired and the ashes were high in fixed carbon.

The feed water should be delivered to the boiler as hot as possible. Heating of the feed water by exhaust steam means a saving of about 1 per cent. of the fuel for each 11 deg. F. rise in temperature.

The exhaust from the auxiliaries should be turned into the heater and, if there are any other sources at hand, enough of these should be used to bring the water up to about 210 deg. F. for an open heater. An open heater is the most economical. In such a heater it requires 1 lb. of exhaust steam for each pound of water at 50 deg. to raise it to 210 deg. If there are no other sources available, turn live steam into the heater. There is of course no saving in this and no loss except that from radiation. The reason for doing it is that the feed water will be as hot as possible when entering the boiler, and will not chill it, causing leaks arising from unequal expansion, as in nearly every case boilers are fed intermittently. Even if fed by automatic

regulators (which sometimes do not feed constantly) cold water is not desirable. I believe, however, that feed water regulators should be installed, for they keep the water at the best steaming level and do away with a water tender.

The feed water should carry as little sediment, corrosive and scale-forming elements as possible. It may and should be treated if it contains any appreciable amount. There are several processes for doing this. Some treat the water cold, others hot. The hot process is apparently the best.

Scale, sediment and dusty flues decrease markedly the steaming ability of a boiler. Dirty and scaly flues should be carefully watched, as flues in this condition not only reduce the efficiency of the boiler but are dangerous as well. It is estimated that the scale and soot resistance to heat transfer is ten times that of the metal itself. Therefore the soot and dust should be blown from the tubes at least once a day.

The draft should be supplied by a blowing fan. Some plants employ two fans, one being held for emergency. It is good practice also to have two pumps. The pumps should be provided with a water pressure regulator which will govern these machines so as not to permit them to burst any pipes should all the valves be closed with full steam on the pump. Some plants supplement their blower equipment with steam blasts or steam turbine blowers. Either of these is less efficient as regards steam consumption than the blowing fan unit and should not be used except for emergency purposes. The value of a steam blower was well explained by W. D. Owens in his article in *Coal Age*, Jan. 9, 1919, page 53, in which he shows that 20 per cent. of the power of the blower plant is consumed in its own operation. Theoretically, it is more efficient to build a chimney of sufficient size and height to give the proper amount of drafts. This is not often practical because of the great height often necessary to produce sufficient draft, because of the load and the quality of coal. However, the chimney should be proportioned so that a slight vacuum, at least, is maintained above the fuel bed. When flames may be seen coming out around the fire doors, it indicates that more air and gases exist within the furnace than the chimney can handle. The practice of blowing a fire too hard, or employing chimneys too small, results in inefficiency as there is a large velocity of gases through the flues and the stack temperature will be high; furthermore, there is danger of warping the boiler front and burning off the fire doors.

The boiler doors, fire doors, air doors, inspection doors, and other openings into the setting, should all be examined for air leaks. This can be done with a candle. All leaks should be stopped up, as the loss through infiltration of excess air is tremendous. The amount of excess air present in the chimney can be found by running a flue gas analysis, which shows the amount of the products of combustion, thus determining the amount of excess air. If the setting is badly cracked it should be repaired. Some plant engineers plaster the boiler walls. Success has attended the use of making a plaster or putty for the cracks of the old pulverized magnesia pipe covering mixed with water. Inspection and cleaning doors that are not used often may be bricked up, while all leaks around the breeching and the base of the stack should be calked.

The baffles should not leak or be out of place. They

should be in such shape as to at once prevent the gases from being either bypassed or choked. The damper in the stack should be so arranged that its position is known exactly.

For the best operation of the average colliery plant, not only from an economic standpoint, but to secure continuous operation, it is well to put a boiler-house foreman in charge. This man, of course, reports to the outside foreman. He has full charge of the plant, keeps the firemen's and ashmen's time, arranges the shifts, and being himself the waterman is on duty during the working hours of the colliery. All repairs to the boilers are under his care and supervision.

Some companies that operate several collieries employ a traveling fireman who is well versed in boiler economics and the handling of firemen. It is the duty of this official to make regular and sometimes irregular visits to the various plants to see how they are operating. It is hard to get experienced firemen, so that a part of this man's work is spent in teaching the "greenhorn."

If a plant is troubled with fluctuations in steam pressure it is wise to install a graphic pressure gage. With this machine in operation any sleeping on the night shift can be readily detected. In one instance a fireman, believing he could beat the detested gage, got his steam pressure up to the desired amount and then turned off the supply valve. The card then showed a perfectly smooth line without fluctuations. Of course, it did not take long to discover this subterfuge, and in the future to lock the apparatus.

If some of the operators had to pay for the coal burned, the operation of the boilers might be an entirely different story; for then they would know the tremendous amount of fuel they were consuming. On the other hand, if they could only realize that what coal is not burned could be sold, it would help some. As it is, however, in a great many cases the boiler house happens to be an evil that must be tolerated and they seem to be resigned to this belief. From what I have seen of the various colliery plants, there is little doubt that the majority of them could show a great improvement if they were placed in the hands of some person who carefully would follow up and improve their daily operation. I have noticed that there is now a strong tendency in this direction.

War-Time Studies of the Prices of Coal and Coke

The coal bill was of dominating interest in the United States and elsewhere during the war and it still commands wide attention. Studies of the prices of coal and coke from 1913 to 1918 were made by C. E. Leshner, of the United States Geological Survey, Department of the Interior, in cooperation with the United States Fuel Administration and the War Industries Board, and their results have just been published by the survey as an advance chapter of its report on the mineral resources of the United States in 1918.

Mr. Leshner's report shows in text, tables and diagrams the fluctuations in prices from the beginning of 1913 to the end of 1918, the restraint on prices exercised by Government control through the Fuel Administration, and the increases in prices that followed the advances in wages to mine labor.

About 80 per cent. of the bituminous coal produced

in the United States goes to the railroads, public utilities and manufacturing industries, which, taken together, represent a market that is very little affected by seasonable changes but that is subject to all the vicissitudes of business conditions—in prosperous and in dull times—that mark the ebb and flow of our industrial life. Of the remaining 20 per cent., 4 per cent. represents exports—an item so small and local as to have no effect on the total—and about 16 per cent. is taken by domestic consumers, whose use of coal is of course seasonable.

Bituminous coal is not stored except by the consumer, but moves directly from mine to user. Exceptions that do not affect the general validity of this statement are found in the stocks held in retail dealers' yards, in the coal held in railroad cars—both small items—and in the coal stored on docks at the head of the Great Lakes, where millions of tons, held for the northwestern trade, are piled up during the season of summer navigation for use in the winter, when the lakes are frozen over and shipments cannot be made.

Ability to get bituminous coal to the consumers, which involves not only the number and size of mines and the number of men but the number of railroads, engines, coal cars, switching yards and sidetracks, must be ample to meet the maximum demand. And if the capacity of the mines and the railroads must be kept up to meet the periodic and temporary big demand for coal, it is evident that in periods of slack demand a part of this huge plant must lie idle.

Conditions in 1917 and in the first nine months of 1918 were quite different from those in preceding years; demand generally exceeded supply and transportation was the principal factor limiting production.

TOO MANY MINES A DETRIMENT

An obvious result of having more mines than are needed at times is the curtailment of output at periods of slack demand and a lowering of prices in an effort to attract business. The cost of production has not always determined the lowest level of price, for ignorance of cost or desire to maintain the working organizations at the mines have often operated to maintain output beyond demand, at times with serious effect on the credit of the industry. For years much coal has been taken from the ground without adequate returns to the producers. The lure of cheap cost of production from thick beds—as in parts of West Virginia and Illinois—and of high prices in prosperous years and periods of coal shortage has attracted to the business of producing coal many men who, once in, have borne loss year after year in the hope of retrieving their losses later.

These conditions in the bituminous-coal industry are significant and should be clearly recognized because they show why, in normal times, the price of bituminous coal is not subject to even moderately wide variations. The low levels are reached when those producers that are willing or able to reduce price supplied the demand. Need for the commodity and not low price induces the purchase of coal. High levels of price are reached when, under the incentive of big profits, production is speeded up and capacity increased to a point where demand is satisfied.

Another and an important reason for fairly stable prices of coal is found in the fact that labor represents nearly 80 per cent. of the total cost of production and that wages are pretty generally maintained through

the unions. Coal miners' wages are fixed by agreements running from two to four years.

The general principles governing the prices in normal times thus set forth continued to operate through 1916 and until the middle of 1917, although in the later part of this period conditions were far from normal. A tremendous increase in demand, which began in the last quarter of 1916 and extended through 1918 until the armistice was declared in November, brought forth an increase in production to a point where the limit of railroad capacity was temporarily reached with the demand still unsatisfied. Because the demand could not be fully satisfied, prices in the fall of 1916 and in 1917 rose to almost unheard-of figures, until first voluntary and later Government control was exercised.

The history of the production of bituminous coal in the United States is a history of the growth of its manufacturing and other industries, but the history of the production of anthracite coal, nearly all of which has been mined in Pennsylvania, is conjoined with the history of the growth of population, for it is the fuel of the household.

ANTHRACITE IN RELATION TO BITUMINOUS COAL

The anthracite mined in Pennsylvania amounts to only 15 per cent. of the coal produced in the country, and the anthracite industry is so notably centralized and limited and so large a part of its output goes to a single class of consumers—the householders—that Mr. Leshner treats this coal separately.

The demand for anthracite of prepared sizes—egg, stove, chestnut, pea—represents 60 per cent. of the total output. Pea coal was formerly considered a steaming coal, but since April, 1916, it has been classed as a domestic coal of prepared size, only buckwheat and smaller anthracite now being classed as steaming coals.

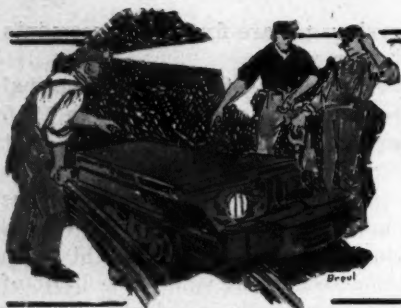
For many years anthracite has been sold at a reduced price in summer to encourage its purchase and storage by the householder, and though these summer reductions are not accompanied by a reduction in the wage of the miners the mining companies have found them very beneficial to the industry, because they permit more uniform operation of the mines throughout the year.

About 75 per cent. of the total output of anthracite is mined by a few companies, commonly known as the "railroad companies," as distinguished from the "independents." These larger companies issue regularly circulars giving prices, to which they generally adhere, but the independents sell above or below the prices quoted according to the market. Mr. Leshner's diagrams show the fluctuation of the prices of anthracite of all classes from 1913 to 1918, inclusive.

Taken all in all, Mr. Leshner's report is a valuable and interesting presentation of the statistics of a commanding feature of the coal industry during a critical period.

A copy of the report can be obtained free of charge from the Director of the United States Geological Survey at Washington, D. C.

Temperature and heat are not synonymous. Temperature is shown in the arbitrary divisions of the thermometer; the Fahrenheit scale has 212 deg. between zero and the boiling point of water. The zero point is 32 deg. below the freezing point of water. On the other hand, heat is a measured quantity—it is measured by the thermometer. As a unit—e.g., the British thermal unit (B.t.u.)—it is the amount of heat necessary to raise one pound of distilled water 1 deg. F.



IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Get Ready!

BY GEORGE N. LANTZ
New Straitsville, Ohio

The newspapers this summer have been filled with advice to the coal consumer. "Buy Your Coal Now" has become as familiar as "I'm a Jazz Baby." The operator has taken occasion to point out the difficulties that will attend later efforts to purchase fuel. The coal associations have added their pleas, and speak of millions of tons to the individual operator's hundreds. The Geological Survey has put forth some interesting diagrams which apparently have not been noticed by those for whom they were intended. The result has been, that, while a few consumers have taken advantage of quick delivery and low cost, production has not been stimulated as much as had been hoped, and an over-demand may be expected this coming winter.

The wise operator will prepare for this, and, if preparations have not already been made, the month of October and a part of November will be an excellent time to make ready, while outside work may yet be done efficiently and inexpensively. Business is not yet so brisk as to prevent or delay needed repairs, and during the crop movement many idle days will be experienced during which everything may be made shipshape in the lull before the storm.

A judicious outlay of cash now may easily mean enhanced profits later on through easier production of higher-priced coal. It is almost sure to mean the ability to take care of old customers, which is good business, and may possibly signify the ability to gain new customers, which, also, is good business.

Have a look at the power plant. Power-plant installations are so varied that specific suggestions cannot well be made. Many mines receive their energy from a central station owned by the coal company or by a power company. Others have their boiler rooms and generate their own power. However, whether there is much or little machinery, the chief engineer should assure himself that the power plant, the heart of the works, is in tip-top shape, and supplied with packing, valves, tools, etc. He should inspect the repair shop and see that all needed material is at hand. He should do all that is needed to prevent a shutdown later.

Ventilation and drainage should be inspected. Ventilation equipment, being permanent, should require little or no additions, but it is well to be assured on this point. Pumps should be kept in proper shape and should be adequate to carry just a little heavier load than ordinary requirements demand, in order to be ready for an emergency.

Hoisting machinery, cutting machines and locomotives should be put in good order and kept that way. The smaller spares, and such larger ones as may be needed, should be on the ground. Keep up stock!

This is not a good time of year for cutting mine props, and seasoned timber may not be available in large quantity. Scattered props, however, can be gathered up and made ready for use. All loose lumber of value should be sorted and piled.

Bad ties should be replaced on both inside and outside tracks. The motor tracks should be well bonded, ballasted and drained. The outside track, at this time, is apt to be somewhat dirty. All ditches should be opened and all tracks cleaned. With coal and mud as high as the top of the rail, it doesn't take much of a snow to stop a motor, or make the use of a snow plow impossible. And we must not forget that we sometimes have snow in winter. While working on tracks, it is important to see that they are of proper gage.

Inspect the tippie or breaker. Whether such a building is equipped with costly machinery or gravity screens, some of the apparatus is likely to get out of order at some time, and now is the time to rectify incipient disability. Car retarders or car-moving devices, if needed, will soon pay for themselves.

Buildings should be put in proper condition for winter. The roofing may need some attention. Look for trouble. Piping may be partially uncovered. Telephone or power lines and wiring may need slight repairs. And the mine cars will want some grease. Probably most coal companies have a schedule requiring a greasing every six months. Probably, too, the cars have not been greased for eight or ten months. The car-greasing schedule seems to be the most easily neglected. Give the cars grease. They'll run better and last longer.

Stock up on feed. Provide comfortable quarters for the livestock. And if this is done for the animals, why not for the men? Buy those few window panes, and get a new stove for the "doghouse." Get the heating apparatus up to standard.

All of these things can be done as easily now as later. And, in the case of outside work, this can be performed much easier at present, and much more economically, instead of waiting till cold and snow add their disadvantages. Hauling, either by truck or team, is slower in winter with necessarily smaller loads. Get as much as possible done before winter is upon us.

Get ready for the demand. We must meet conditions as they exist. If consumers will not buy coal when we want to sell it, let's sell when they want to buy. Perhaps, since July 1, there has not been much room for coal in the cellars, anyway.

At any rate, let's quit wondering why we cannot produce all the coal in the summer, and spend the winter at Palm Beach, while the husky miner sits before the fire with his pipe and P. A. Let's turn the problem over to the psychologists, and let them explain why the consumers do not buy their coal in May and the coalmen their skates in July.

Instruction in Rescue Work

All of the local officials at a mine should from time to time be instructed in what they should do either collectively or singly in case of a mine explosion or of a fire within or without the mine that might endanger the men underground. Especially should all the officials and men in authority over work above ground be instructed as to their duties following such a disaster or accident. To this end, they should be shown where material and tools may be quickly obtained at the mine or supply stations, or from adjoining mines, and from the nearest jobbers, sawmills, planing mills and wholesale houses. The officials should be so instructed that in the absence of superior authority, they will be able to attend promptly to those things that are of the first importance. They should be instructed to consult a list of persons posted in the various offices, shops and power or engine houses, who should be immediately notified, giving particular attention to the summoning of the state mine inspector, rescue crews and doctors.

A Frogless Crossover

BY RALPH W. MAYER
California, Penn.

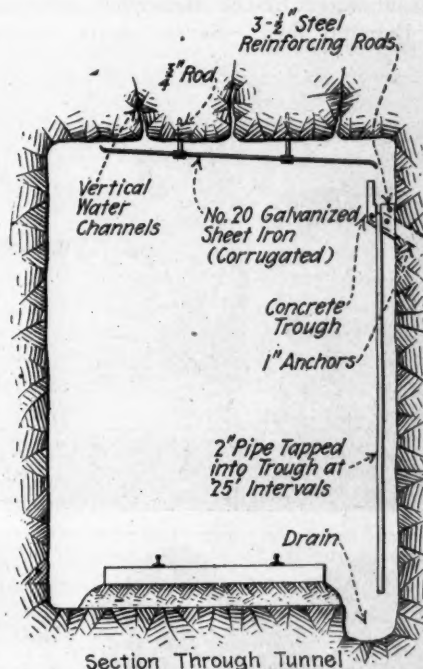
A frogless crossover track is shown in the accompanying illustrations. Such crossovers are particularly advantageous where rope haulage is employed and some provisions for a crossing of tracks must be made. As may be clearly seen, the rails of the crossover are hinged at opposite sides of the main track. When it is desired to use the crossover these rails are swung into place, resting upon the rails of the main track. The free end of each movable rail when thus in place is held from moving by a fishplate bolted to the outside of the stationary rail, against which it is pressed by a forked rod actuated by a self-locking lever mechanism, the hand-lever member of which is provided with a weighted D-handle.

Since the movable rails, even though they may be of heavy cross-section, are of comparatively short length and hinged at one end, they may be swung into place and fastened there quickly and with little effort. For light, narrow-gage crossovers where the angle of crossing is a right angle or nearly so, the Oliver & Snider Steel Co. at some of its mines uses a short, solid, removable length of track. The rails are securely fastened together with bridle bars and braces. The flanges are cut away on the ends of the movable section so that the webs will slip into place between fishplates bolt-

ed to the stationary rails. The movable crossover section is kept beside the place where it will be used and when it is needed it is easily lifted into place; after it has served its purpose it may be as easily lifted out and put aside until it is needed again. The base of the crossover rails should be at the same elevation as the top of the permanent track rails.

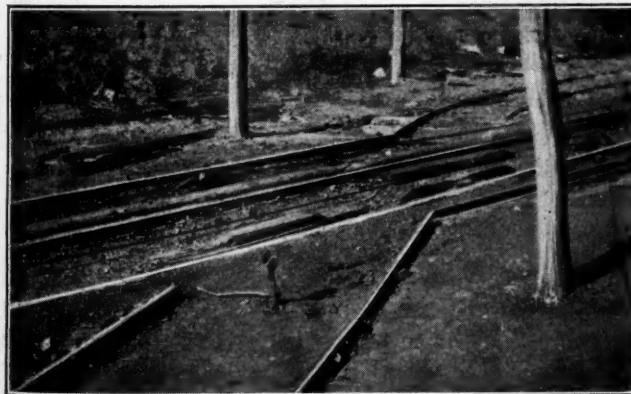
Water Drain for Wet Roof

In driving a drift to be used as a main haulageway at a mine in Southeast Missouri, the workmen cut several water-bearing strata that continued to flow after the drift was completed. As a means of preventing the leakage of water from the roof, a system of collecting and draining, shown in the sketch, was satisfactorily installed at a moderate cost and with little consumption of time. As continuous dampness made the preservation of

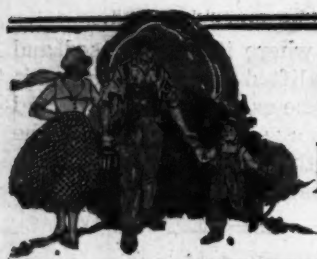


WATER DRAIN FOR TUNNEL HAVING A WET ROOF

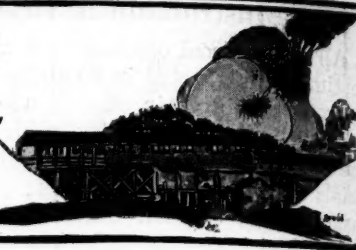
wooden construction difficult, concrete installation was decided upon. Considering that this latter type imposes practically no cost for maintenance, and that the wet part of the tunnel was short, the additional initial expense was considered justifiable and a permanent installation was provided.—*Engineering and Mining Journal*.



FROGLESS CROSSOVER TRACK, SHOWING FORKED ROD AND LOCKING LEVER (ON LEFT) AND RAILS REMOVED FROM UNDER TRACK (ON RIGHT)



DEPARTMENT OF HUMAN INTEREST

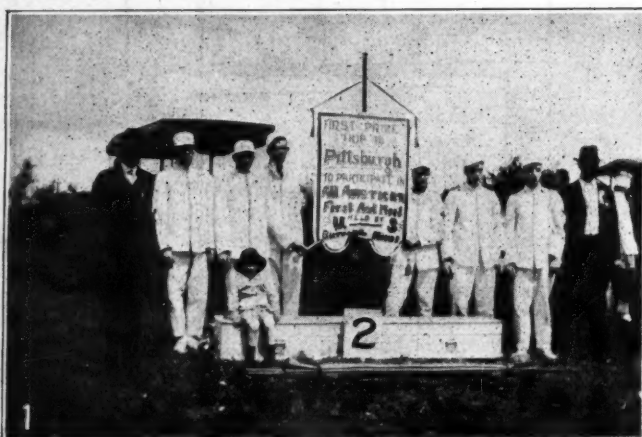


First-Aid Meet at Ebensburg

The fourth annual first-aid meet of the Inland, Argyle and Mountain coal companies, which was held at the Belmont field in Ebensburg, Penn., on Labor Day, was voted the most successful event held. The meet was originally scheduled to be held at Griffiths field, but due to the presence of a Chautauqua tent on the grounds, the site was changed to the somewhat more spacious grounds at Belmont field. Seven teams, representing

Gallitzen, acted as manager of events. Inasmuch as it was believed that the competition at the national meet would be lively, a close system of scoring was put into effect that the winners might experience the same careful scrutiny of their work that they would be later subjected to in Pittsburgh.

Three full team events were run off as follows: (1) Man is found with simple fracture of right elbow, compound fracture of left leg, arterial bleeding, dislocation of right hip, and a wound over left eye. (2) Treat a



SCENES AT THE FOURTH ANNUAL FIRST-AID MEET AT EBENSBERG, PENN.

1—No. 2 team, which captured first prize and will represent the Argyle Coal Co. at the international meet at Pittsburgh. 2—No. 4 team, Inland Coal Co., last year's prize winners. 3—No. 1 team, Argyle Coal Co., winners of the second prize. 4—No. 7 team in action.

the different operations of the above companies, paraded the main streets of the county seat of Cambria County, led by the Italian Society Band of Gallitzen, and later assembled before a small but appreciative crowd at nine o'clock in the morning. Practically all of the participants were ex-service men, which added interest to the competitions.

The first prize was a trip to Pittsburgh, to take part in the national contest to be held the last two days of September by the Bureau of Mines. Fourteen judges were selected from prominent physicians of Blair and Cambria Counties, in which Dr. T. U. Ferguson, of

broken kneecap; dislocated right shoulder; fracture of jaw; and dislocated forefinger of right hand; place on stretcher. (3) Man is found unconscious on electric wire, face down, clothing burning; treat burns on front of chest and both arms.

The No. 2 team, captained by J. S. Jarvie, from the Argyle Coal Co., at Southfork, captured first prize and with it the honor to be the representative team at the national classic. The high score of 99.33 was made by the No. 2 team, and judging from the manner in which the men handled themselves on the field there is going to be some tough sledding ahead for any first-aid team

that expects easy sailing at Pittsburgh. Intent upon keeping as many of the prizes in the family as possible, the No. 1 team from the same mine at Southfork claimed second place with a commendable score of 97.88. Gold watches were received by each member of Captain John Sloan's No. 1 team. Closely pressing the second prize winners was Captain Ray Joseph's team from the Inland Coal Co., at Nettleton, who finished a strong third with a score of 97.33. Each member received an attractive gold stickpin. The surprise of the morning was furnished by the No. 4 team from the Inland Coal Co., at Gallitzen, which ran away with the first prize last Labor Day. The team finished seventh with a score of 92.66, which tends to bear out the old adage that youth will be served, as last year's event was held under abnormal conditions and the participants were conspicuous by their age.

Judge J. T. O'Connor, of Cambria County, officiated in the presentation of the prizes, during which choice bits of humor were interspersed. Following the meet a parade back to the main part of the city was held, from where the men dispersed to either get acquainted or renew acquaintance with one of the hotel meals for which Ebensburg has long been famous. Much of the credit for the manner in which the meet was run off, as well as the general good feeling that prevailed throughout, is due to genial M. J. Bracker, general superintendent of the three companies, who is a great favorite with the men.

Mine-Rescue and First-Aid Contest in British Columbia

BY ROBERT DUNN
Victoria, B. C.

An international competition in mine-rescue and first-aid work took place at Nanaimo, B. C., on Labor Day, Sept. 1, under the auspices of the Vancouver Island Mine Safety Association. As it was the first meet held in western Canada that was attended by representatives of the coal-mining districts of the State of Washington, and the first for a number of years to bring teams from the Crow's Nest Pass coal field, eastern British Columbia, the event attracted unusual attention and the added interest stimulated those entering to special training.

The result, it is admitted frankly, was a disappointment to the Canadians. The men from the Pacific Coast Coal Co. won the British Columbia championship shield, and second place was taken by the team representing the Roslyn Fuel Co. Consequently, the trophy has left the Province for the first time. It must not be supposed that the British Columbians were anything but good losers. They congratulated the victors spontaneously and warmly, their sentiments being well expressed by Hon. William Sloan, Minister of Mines, when, in the course of the presentation of the prizes, he said that, while the visitors unquestionably had won on their merits and so were entitled to the hearty congratulations of which they had been the recipients, they would find the Canadians back next year determined to reverse the present decision.

There were nine teams entered. Besides the two from Washington State, the Canadian Western Fuel Co., of Nanaimo, B. C., had three; the Crow's Nest Pass Coal Co., Fernie, B. C., one; the Granby Company's Collieries, Cassidy's, one; and the Canadian Collieries (D),

Ltd., two—one from the Extension and the other from the Cumberland mines. Of these the Cumberland team only was equipped with the Draeger apparatus. Those from the Roslyn company and from the Canadian Collieries (D), Ltd. (Extension) used the Paul, while the remaining six teams were provided with the Gibbs.

The usual boarded structure represented the mine and the problem, which was not varied, was that an explosion had occurred and the miner to be rescued had barricaded himself in against the gas, the ventilation, of course, having been cut off. It was simply stated that the said miner was alive, nothing being given as to whether he was injured or overcome. For this reason it is interesting comment that all the teams bore the patient from the mine on a stretcher, none taking advantage of the opportunity to merely walk him through the bad air to the surface with a breathing machine as protection. The judges were James Bagley, state mine inspector for Washington; R. Schonning, manager of



WINNERS OF THE DEPARTMENT OF MINES TROPHY

the United States Bureau of Mines staff, Washington State; George Wilkinson, chief inspector of mines for British Columbia; and Dudley Michel, instructor in first aid and mine rescue work for the Provincial Department of Mines.

An analysis of the marking of the judges is illuminating because it shows that the competition was won and lost, not in actual mine rescue work but on the testing benches where the judges—Messrs. Michel and Schonning—presided and where the apparatus of the contesting teams was subjected to a rigorous test prior to being buckled on the men. The Fernie team was the first to go through. It had no trouble with the Gibbs machines, escaping without a deduction because of "loose joints or connections." In mine work, however, 36 points were lost. A leak cost the Roslyn team 10 points while 24 were dropped in the mine. The Pacific Coast Coal Co.'s team, Black Diamond, winners of the shield and championship, were penalized 10 points for a leaky joint or connection and 15 for their performance in the mine. Laird's team, of the Western Fuel Co., lost 60 points for leaks in apparatus and five in mine work. The Extension team dropped 90 points for leaks in apparatus and 45 for its work in the mine. The remainder may be summarized as follows:

	Loose Joint or Connection	Mine Work
No. 2 team, Western Fuel Co., Nanaimo.....	30	40
Cumberland team—Canadian Collieries (D) Ltd...	70	35
Granby Collieries (Cassidy's)	100	49
No. 3 team, Western Fuel Co., Nanaimo.....	30	20

It will be seen from the foregoing that there were two

teams which stood, in actual performance in the mine, head and shoulders above the others—the Pacific Coast Coal Co., Black Diamond, and No. 1 (Laird's) team of the Western Fuel Co., Nanaimo, B. C. Although, as stated at the outset, the Canadians are not disposed to withhold any of the credit due those who came from the other side and took the honors, they quite naturally feel that it is rather too bad that the decision should have gone against them solely because of minor leaks in apparatus, located through the severe test of soap suds



NO. 4 TEAM ENTERING MINE WITH STRETCHER

and penalized, when found, to the maximum extent. Mr. Laird and his men point out, too, that the apparatus which they used had previously been through the test, in the hands of the Fernie team, without a leak being found and that that experience no doubt accounted for what looseness subsequently developed

Of this there cannot be any doubt: that the Black Diamond and the Nanaimo teams were the best in actual mine rescue work on their showings in the competitions under review and that the Laird team, apart from the discrepancy found in its apparatus, must be congratulated on its performance in the mine. The men on the team did remarkably well.

In passing, it may be observed that the "soap sud" test no doubt was the result of the very keen competition between the Gibbs and the Paul apparatus and their representatives on the Pacific Coast. The former was represented by H. H. Sanderson, the western manager of the Mine Safety Appliance Co., and George Riggs, the factory expert; and the latter by A. G. Menny, of the American Atmos Corporation.

In the first-aid competitions the honors were fairly evenly divided, the results being as follows:

Department of Mines Cup: (1) J. W. Jemson's team, Nanaimo; (2) George Carson's team, Nanaimo.

One-Man Event: (1) J. S. Murphy, Pacific Coast Steel Co., and Julius Tonda, patient; (2) R. Charnock, Nanaimo, and J. McCourt, patient.

W. L. Coulson Cup: (1) Joe Barton's team, Nanaimo; (2) J. Brown's team, Nanaimo.

Juvenile Cup, open for annual competition and offered by the Vancouver Island Mine Safety Association: (1) Ladysmith, R. Ferguson, captain; (2) Nanaimo, R. Jackson, captain.

Two-Man Event: (1) Nanaimo, A. McNeill, captain; (2) Roslyn Fuel Company.

Open Event (open to all working miners): (1) Nanaimo, Joe Barton, captain; (2) Nanaimo, A. McNeill, captain.

First-Aid Contest at Jellico

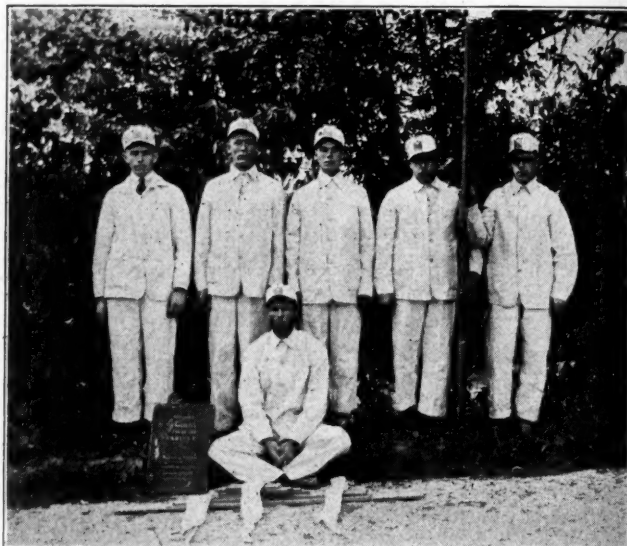
On Saturday, Aug. 23, a first-aid contest in which seven teams participated, was held at Jellico, Tenn., under the auspices of the Tennessee Coal Operators' Association and the Bureau of Mines. This contest was given to stimulate interest in first-aid work at the mines and to decide what team would represent the State of Tennessee at the national first-aid meet that was held at Pittsburgh, Penn., on Sept. 30 and Oct. 1.

One of the teams entered was sent by the Federal Coal Co., which is located at Arjay, Ky. Six of the teams represented Tennessee coal companies and one team came from the American Zinc Co. ore mines at Mascot, Tenn.

Four first-aid problems were given the teams: A one-man event, a two-man event and two full-team events. These problems represented injuries commonly met with in coal mining, consisting of fractures, cuts, bruises and electric shock. The penalties in each event were totaled against the team, thus eliminating the one- and two-man prizes. This was done in order to simplify the distribution of awards.

The American Zinc Co., of Mascot, Tenn., and the Highcliff Coal Co., of Pruden, Tenn., tied for first place. A one-man event was selected and the two teams contested to see who would be given first prize. The American Zinc Co. team won by a close margin.

The first prize was \$325 and six gold watch fobs, the latter being donated by *Coal Age*. The cash prize was to be applied to the expenses of the team's trip to the national first-aid meeting at Pittsburgh. The



AMERICAN ZINC CO. TEAM, WINNERS OF FIRST PRIZE

second prize consisted of eight 25-lb. cans of carbide and six nickel-plated lamps.

The contest was witnessed by about 2000 people. Ice cream and soft drinks were served free to the miners and their families, the money expended for the refreshments being donated by the business people of Jellico.

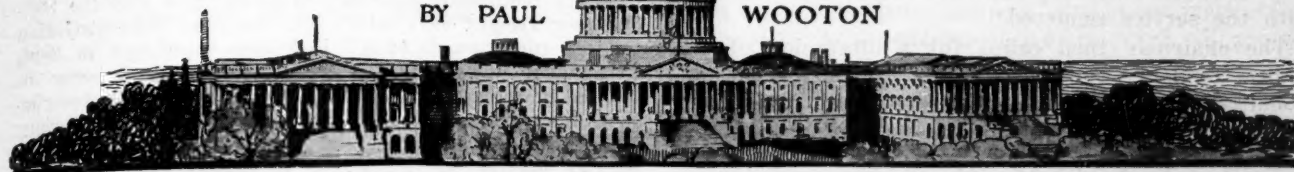
The teams were instructed in first-aid work by J. M. Webb, of the Bureau of Mines, assisted by V. D. Splane, of the Bureau of Mines of Pittsburgh, Penn.

J. T. Moore, cashier of the Jellico Bank and Trust Co., of Jellico, Tenn., was chairman of the finance committee; J. M. Webb, of the Bureau of Mines, was chairman of the general committee.

NEWS FROM THE CAPITOL

BY PAUL

WOOTON



Independent Operators Testify at Coal Industry Investigation

"Coal is at the present time in a somewhat go-as-you-please condition. I feel that there ought to be closer coöperation between the Government and those who produce this great necessity; that there ought to be a better knowledge of conditions available to those who legislate and to those who consume; that there ought to be some agency to which the coal operators may go and to which the consumers may go." This statement by Senator Frelinghuysen, the chairman of the subcommittee investigating the coal situation, as well as others made by him and by the questions he is asking, is taken to indicate that he will recommend a more intimate relationship between the Government and the coal industry.

While Senator Frelinghuysen had in mind when he made the foregoing statement the matter of statistics on coal consumption, he also has more in view, judging from the following verbatim extracts from his comment at last week's hearing:

"I am wondering whether or not the Government should have some one acting in an advisory capacity, procuring information for the benefit of all and bringing about a better coöperation without meddlesome interference, without a desire to confiscate, allowing the men who have owned property and who have built up this great industry to continue, but still studying conditions to bring about fair prices so that not only the consumer may benefit but also the operator may not be treated unfairly."

At last week's hearing practically all testimony taken had to do with the anthracite situation. A. B. Jessup, the vice president and general manager of the G. B. Markle Co., testified with regard to the situation from the standpoint of an independent operator. While Mr. Jessup was attempting to justify the increase charged by the independent operators over the price charged by the railroad companies, Senator Frelinghuysen interrupted with this question: "There were pretty large excess profits taxes paid by the mine owners, were there not, in the year 1918?" This question was followed a moment later by another: "Why was it necessary for those operators who were not losing money to advance their prices?" A portion of Mr. Jessup's answer is as follows:

"It probably was not necessary for some operators to advance prices, but many of them had low profits in the past and looked forward to low profits in the future. The excess profits tax automatically takes care of the excess profits of those who produce at low cost." To this Senator Frelinghuysen retorted: "Yes, but it does not take care of the consumer."

Explaining further in regard to the differential above the company price, Mr. Jessup said: "The whole trouble as I see it, is that the railroad company's price, on which this differential is computed, is wrong. It has been wrong for 20 years or more. The railroad coal company's price is such that they do not earn a fair return on their invested capital. The independents are required in normal market to compete with them on the basis on which the railroad companies themselves do not make more than 1 or 2 per cent. on their invested capital. These railroad coal companies and their associates have two sources of income: one the profit they may make on their coal operations, the other the profit they may make from hauling that coal to market. The individuals do not participate in the freight rate and therefore they must have a fair return which, with all the hazards of mining, ought not to be less than 10 per cent. on their invested capital. This differential only applies on 70 per cent. of the tonnage. Thirty per cent. of the tonnage is in steam sizes, and all the year round it is in competition with bituminous coal and therefore brings what it can in competition with bituminous coal. The 75c. differential spread over the whole output would be about 50c. a ton difference."

With regard to royalties, Mr. Jessup expressed the opinion that 70c. or 75c. would be asked now as compared with the 35c. which has prevailed for 20 years.

The chairman of the committee had some difficulty in understanding why, if coal costs \$3.20 to produce in one mine and \$6.30 in another, the consumer should not have the benefit of the low-cost production. He evidently was convinced by Messrs. Jessup and Dodson, who cited examples of farm products and copper, that the low-cost producer along with the high-cost producer receives the market price which the production of both tends to fix. "Strangely enough," said Mr. Dodson, "it just happens in the anthracite business that the low-cost operators are not demanding all that the market would pay them. I suppose they are doing that in order to steady market conditions, and because they feel that they are producing a necessity."

A striking statement came from Mr. Connell, another of the independent operators, during the discussion of the labor situation. "If the American public or the Senate," he said, "will allow themselves to be dominated by an organization of 700,000 men, which are included in the bituminous and anthracite United Mine Workers of America, and if they will allow them to be granted such wages and such hours of employment as they in their pleasure demand, and Congress is silent as to it, why should the American public expect the operator to be their sole protector in this matter?" This brought forth the following expression of opinion from the chairman: "I feel that if Congress goes out of its prerogatives to limit the hours a man can work and on

the other hand limit the price that a mine operator shall receive, that they must go to the limit. They must fix not only the prices of food that he eats, but they must also fix the scale of wages commensurate with the service rendered."

The chairman then called for a discussion of the radical tendency toward Government control and nationalization. Mr. Jessup's idea, expressed in that connection, is that there should be no control exercised over the industry in peace time such as that given the Fuel Administration during the war. He believes the filing of costs is proper in that it gives the Government an opportunity to see what is being done in the way of production costs. If there are abuses they can be developed from those figures, he pointed out. The same question was put to Mr. Connell, who said that the industry is in safer hands under the law of supply and demand than under Government regulation. He pointed out that after the Civil War anthracite prices went to \$12 at the mines, which decreased as conditions became normal.

W. J. Thompson, secretary of the Anthracite Coal Operators Association, presented to the committee a tabulation of costs and realization of individual operators. His figures, which represent 60 per cent. of the output by individual companies, show the average cost per ton, January to July, as being \$5.52. The average selling price during the same period was \$5.20 per ton, a net loss of 32c. per ton. The average profit for individual operators on fresh-mined and bank coal during 1917 was 44c. per ton, Mr. Thompson stated.

Asks for Cooperation from Receivers and Shippers of Freight

Walker D. Hines, Director General of Railroads, on Sept. 22 authorized the following statement, asking the further cooperation of shippers and receivers of freight in promoting freight-car efficiency:

During the war, no one was more patriotically helpful than the American shipper. With zeal and efficiency he did his part in the common cause. The Railroad Administration had excellent opportunity to observe this attitude during the war and has appreciated heartily the subsequent continued cooperation of the great majority of the shippers. The time has now come for renewed efforts by both the Railroad Administration and the shippers and receivers of freight so that the nation's transportation service may be rendered with the greatest satisfaction possible under the circumstances.

An unusually heavy grain and coal movement, deferred repair and the construction of public highways in all sections of the country and the concentrated requirements of suddenly reviving business combined with the usual transportation requirements at this time of the year, threaten a serious lack of transportation facilities unless all parties interested cooperate in securing the greatest possible utility from the existing limited transportation facilities. In this connection attention is invited to the following extract from a recent public statement of the President:

"We have now got to do nothing less than bring our industries and our labor of every kind back to a normal basis after the greatest upheaval known to history, and the winter just ahead of us may bring suffering infinitely greater than the war brought upon us if we blunder or fail in the process. An admirable spirit of self-sacrifice, of patriotic devotion and of community action guided and inspired us while the fighting was on. We shall need all these now, and need them in a heightened degree, if we are to accomplish the first tasks of peace."

The Railroad Administration will do its full part. The Car Service Section in Washington and the various regional organizations are striving earnestly to secure a fair and just distribution of the existing equipment as well as to meet the requirements of individual shippers. Of the 100,000 new freight cars which the Railroad Administration ordered constructed, 59,409 had been completed on Sept. 13 and are now in service, and this number is being increased at the rate of over 900 each working day. Instructions have been issued to all regional directors to bend every effort to speed up road and yard movements, to secure heavier loading of equipment, to establish and maintain complete and accurate yard checks, to reduce the number of bad-order cars, to make prompt delivery to connections, to effect early deliveries at freighthouses and teamtracks, to reduce the number of freight cars used in the transportation of company material and to expedite the movement of grain cars in terminals. The hours of labor of car-shop employees have been increased and every effort is being made, both in railroad shops and in the shops of private concerns to whom the work is being let out, to reduce the number of bad-order cars.

I earnestly urge all shippers and receivers of freight to redouble their efforts to promote freight car efficiency. Shippers of freight can assist by loading all cars to full visible or carrying capacity; by prompt loading and release to the carrier; by ordering cars only when actually required; by eliminating the use of railway equipment in trap or transfer service when tonnage can be handled by motor truck or wagon; by reducing the diversion and reconsignment of cars to a minimum.

Receivers of freight can assist by prompt unloading of cars and notice thereof to the carrier; by ordering goods in quantities representing the full safe carrying capacity of cars and disregarding trade units; by ordering from the nearest available source; by pooling orders so as to secure full car load.

A resumption of intensive loading will not merely reduce the number of cars under load but will also relieve congested terminals where it is a question of track room rather than of equipment.

With a strong concerted effort on the part of the Railroad Administration and the shippers and receivers of freight, it is hoped that during the period of abnormally heavy traffic with which we are now confronted the nation's transportation needs may be met with reasonable satisfaction to all parties. I earnestly ask the continued and even more effective cooperation of all shippers and receivers of freight.

Strengthening of Patent Office

The Engineering Council's Patents Committee has been collaborating with a similar committee appointed by the National Research Council in the development of a scheme to improve the governmental methods of dealing with patents. The staff of the Patent Office is itself actively assisting in this effort. Out of the report prepared by the National Research Council, and approved and adopted by the Engineering Council as the report of its Patents Committee, remedial legislation has taken form. Three bills have been introduced, known as H. R. 5011 (a bill to make the Patent Office independent of the Department of the Interior or any other department, and to simplify the procedure of the courts with reference to assessment of damages or profits for infringement of patents), H. R. 5012 (a bill to establish a single Court of Patent Appeals) and H. R. 7010 (a bill to increase the force and augment the salaries in the Patent Office).

Chairman Charles A. Terry, of the Patent Committee, requests that representatives of the Engineering Council write to their congressman, urging the passage of these bills, and so far as convenient, request their friends to do likewise.

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The Workman Is Worthy of His Hire

IN A land of free schools and a system of education that renders it not only inexcusable but a positive crime for any child to grow up in ignorance, people have always regarded the professional educator with a considerable degree of respect. In the older days the teacher of the local school was held in an esteem second only to that of the clergyman or religious leader, and the income from his chosen profession while seldom bounteous was, in the majority of instances, at least equal to reasonable necessities. This held true alike for the girl who had charge of a kindergarten and for the spectacled, bewhiskered, absent-minded individual occupying a professor's chair in the most advanced college or university. Throughout all ages and times, however, while the purveyor or transmitter of learning might gain fame he never gained fortune; the reward for his services consisted of glory, not pelf.

The lot of the professional teacher, never a path of roses, has been rendered doubly difficult in the recent past because of the rising costs of commodities as compared with the standards of previous days. This burden has fallen particularly heavy upon the more elderly incumbents—upon instructors and professors in institutions of higher learning. The young man or woman teaching in a country school or in one of the grades in a town or city can in many instances change from the schoolroom to the factory or office, but the man whose sole experience in life has been confined to the classroom and the campus finds it not only extremely distasteful to alter his chosen profession, but discovers that in the industrial world he has little adaptability and no employer appears to have a niche open that he is capable of filling to advantage.

The effect upon the educational institutions themselves is equally disastrous. There is competition among colleges in many instances quite as keen as that existing between the athletic teams representing their respective student bodies. The reputation of any college or university depends upon the amount and quality of instructional work done, and the most gifted instructors can hardly be secured if the salary available is insufficient to provide a respectable living for the instructor and his family.

If any one will look through the "want ads" of any reputable technical journal at about this season of the year, or preferably a little earlier, he will find many inquiries for instructors and professors in various branches of engineering, but the salaries range from \$900 per year for the subordinate positions up to about \$5000 per year for the highest places (such as the best paid professorships) that any of these schools have to offer.

It is poor encouragement to the able-bodied, husky boy who is trying to decide whether he should go to college or get a job at once, to see men with technical education and years of experience drawing salaries about

comparable with the wages of a hod-carrier, and which fall far short of the income of such trades as that of plumber or miner.

In order to obviate this condition some institutions with well organized alumni, such as Harvard, will shortly launch a campaign to establish an endowment fund or increase such funds of this character as already exist. In the case of Harvard, a minimum of eleven million dollars as an unrestricted endowment is sought.

While it possibly may be said, with much truth, that a college professor is "no better than anybody else," it is equally true that he should be treated no worse than anyone else. When locomotive engineers are drawing aggregate wages greater than the salaries of the governors of the states through which they run, when helpers in certain trades receive \$8 per day and vast increases have been made in the remuneration paid to skilled, semi-skilled and unskilled labor, it seems about time that some sensible increase be made in the salaries of professional educators in general. Otherwise it will only be a question of time before the efficient instructor of youth will be as thoroughly extinct as the great auk or the bison.

Ex-Senator Hamilton Lewis assures us that the President is going to seek the socialization of the coal and oil industries. The President, having failed to run the railroads satisfactorily, is seeking to manage two other businesses. He must indeed be slow to recognize his failures if he is so anxious to add to them two others.

A Coming Machine

IN HIS upward course from savagery to civilization man has progressed by successive stages or ages—the Age of Stone, the Age of Bronze and the Age of Iron. We usually think that we now live in the latter, but in a more strict sense the present is in reality the Age of Machinery.

Until comparatively recent times the human hand performed practically every industrial operation that was performed—and did it poorly. Then came tools (crude affairs at first, but improved in design and quality from time to time) driven or operated by the energy of human muscles. And finally came instruments or implements actuated by animals, by water-power, or by the energy of heat, but in any case by some force greater than any that man himself could develop.

To most industries power, either mechanical or electrical, has been generally applied, and coal-mining is no exception. Most of the processes through which coal passes on its way from the face to the furnace are "powerized" to a greater or less extent. One process, however, in the vast majority of instances must still be performed by hand, or rather by shovel, hand-driven—the process of loading at the face.

Loading is the most expensive operation performed upon coal during production and preparation. Many attempts have been made to perfect a power shovel or loading machine; some have met with a degree of success, while others have been entire failures. This field for invention is both inviting and rich, and it is by no means beyond possibility, or perhaps even probability, that the next few years will see introduced a successful loading machine capable of application in beds of even average thickness.

Because of the fleeting character of news, the newspapers of the country can have but a local circulation. They are naturally disposed, therefore, to be in a degree sectional. But the technical press is and will be national unless it is too greatly harried by unjust postal zone laws.

Some Men Are Big Enough to Ignore Facts

DIRECTOR GENERAL HINES of the Railroad Administration, in his testimony for the Freylinghuyesen committee, had the boldness to make the following statements: "The Railroad Administration is doing everything in its power to meet a transportation situation of unusual difficulty. We are utilizing every expedient that can be developed to enable us to transport, during the latter part of the year, the coal which the public omitted to buy in the early part of the year, and which it will want to buy in the latter part of the year."

The first composite statement is, perhaps, true. The Railroad Administration may now be doing everything in its power, and the transportation situation may be of unusual difficulty. But who is responsible for the situation? No one but Mr. Hines, who deliberately laid off shop hands when troops were being demobilized, and the Government was appealing to patriotic American business men to buy early, and so help the situation, and to take on the discharged soldiers.

The maximum of patriotism should be exhibited by those in the employ of the State. They must not be allowed to consider for a moment their reputation as managers or statesmen when the interest of the State points the other way. A jealousy for permanence in office or a desire for the plaudits of the people should not for one moment influence their action when a plain duty confronts them.

Clearly, a false economy might have deceived the people for a while as to the success of the management afforded by a socialistic administration of the railroads, but that personal advantage to Walker J. Hines should not have swayed him a moment when he reflected that to hold up the repair of cars would destroy our transportation system, make the losses on railroad business greater in the long run, dissatisfy the shopmen, make the mine workers restless, make work scarce and perhaps cause a panic. The public has no sympathy with Walker J. Hines. He tried to pull down the whole financial structure, and in doing so he dislodged a few stones on his own benighted head. The public cares nothing for his groans, knowing well his wounds were self-inflicted. They were not incurred in promoting the public welfare.

The complaint he makes against the public for not buying would be honorable if made by anyone but him. As he was the slowest of the buyers himself, why should he blame the public? It seems to be the obsession of the little minds of our present-day muckrakers to blame the public for pursuing the same courses that they follow, though they travel them with much less reason.

Mr. Hines would not buy coal. He always felt sure he could commandeer it when he pleased. The difficulties are largely of his own creation. Had the Railroad Administration bought coal, the act would have stimulated in real manner that buying which the railroad officials have verbally advocated. Mr. Hines will say the price for coal was too high, though the prices were well below those set by the Government. They were

lower for him than for anyone else. But if they were too high for Mr. Hines, does he seriously propose to condemn others for arriving at the same conclusion? Were not his attempts to break the price to a level below actual cost the cause of the slow buying of the public?

Mr. Hines says: "In the first six months of the year traffic of all sorts, particularly coal traffic, was below normal." That is true; but, being so, why, in the name of common sense, is the Railroad Administration found at this time with its coal-hauling equipment crippled and on the repair tracks?

Simply because Mr. Hines waits till it rains to shingle his roof, hoping that when the rain falls he can make his neighbors assemble on the shingles and patch the leaks with temporary expedients such as embargoing, pooling, zoning, commandeering and workless days. Seeing he is so ready to speak ill of his neighbors, it is distressing to see how ready he is to call on their aid.

Walker D. Hines, you have indeed a "hard row to hoe!" Perhaps you reflect with regret that the hoeing is difficult solely because you yourself planted crooked rows.

What Will the Traffic Bear?

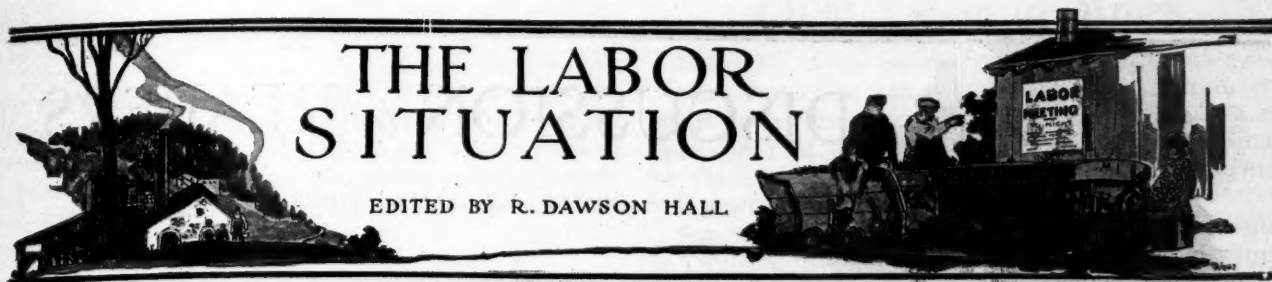
IN A world as intensely practical as the planet upon which we live, economic law is as inviolable as either the statutes of the land or the ten commandments. Those who transgress either are certain sooner or later to meet their just punishment.

The coal miners in convention have just adopted resolutions calling for increases in pay, decreases in working time and other "improvements" upon existing conditions. These alterations are vast and far-reaching. In a complex and interdependent social fabric they affect alike the adjacent and the uttermost fibers. The demands of the miners are not against their employers alone; they affect directly, or indirectly, or both, every man, woman and child upon the face of the earth. In the last analysis the increase asked, if granted, will find its way from the coal upon which it is first placed to any and every article of consumption into which that coal or its product in any wise enters, or which it in any wise touches.

It was an old and wise rule of railroading (applied in the days when we really had railroads) that no tariff or freight rate should be made "greater than the traffic will bear." A low tariff encouraged traffic; a high tariff discouraged it. The best results were obtained when the net product of tariff and traffic was a maximum.

This is true economics, and the mine workers might well give heed thereto. A high wage scale discourages production because it discourages consumption. A low wage scale encourages consumption, and this augments production. The logical wage scale would be the one that would secure to the miner the greatest yearly return.

Many conservative observers believe that insistence upon the conditions embodied in the resolutions recently adopted will be insistence upon a wrong economic principle. By charging the high wages demanded the miners not only will vastly raise the already high cost of living, but they will be charging "more than the traffic will bear."



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Labor developments of the current week have been many. It seems that the mania to strike is as contagious as the "flu," if not even more so; nor is the germ confined to any one trade or calling. The demands to be made by the United Mine Workers of America, assembled in convention at Cleveland, Ohio, have been formulated and are in many respects the most radical yet drawn up. They include demands for \$8 per day for six hours' work and 60 per cent. increase on all tonnage, yardage and deadwork prices, a five-day week, time-and-one-half for overtime, the abolition of double shifts, elimination of the automatic penalty clause and the establishment of weekly paydays.

Even such demands as these have their humorous side. One of the delegates to the convention aptly stated conditions when he remarked that the committee had omitted just one important point, and that was that they had not demanded that the weekly pay be given in advance.

The miners say that unless these demands are granted in toto on or before Nov. 1 next, a strike will be inaugurated. The radical tendencies of the rank and file, and the unrest of manual workers everywhere, appear to have instilled in the breasts of the leaders a fear that unless the demands of the radicals are put to a test they (the leaders) will face political defeat and oblivion.

It need hardly be said that the public is unprepared to pay without a murmur the increased prices which the granting of these demands would entail. Consequently, it is believed by many that nothing short of a showdown will satisfy the miners. The resolutions as formulated by the committee are as follows:

1. We recommend that this report be accepted as a substitute for all wage-scale resolutions that have been presented to the convention.
2. We recommend that this convention demand a 60 per cent. increase to be applicable to all classifications of day labor and to all tonnage, yardage and deadwork rates throughout the Central Competitive Field.
3. We recommend that this convention demand that all wage agreements that are negotiated to replace existing agreements shall be based on a six-hour workday, from bank to bank, five days per week.
4. That all day labor shall be paid time-and-a-half for overtime and double time for all work done on Sundays and legal holidays.
5. That all agreements entered into by the United Mine Workers of America shall have incorporated therein a provision providing for a weekly payday.
6. That all double-shift work on coal shall be abolished except as may be necessary for development and ventilating purposes, and development for increased tonnage shall not be regarded as being a reason for double-shift work; it being understood that this rule shall not be applicable to new mines that are in the process of development.
7. That no automatic penalty clause shall be written into any agreement entered into by the United Mine Workers of America.
8. That all internal differences not covered by joint interstate agreement shall be referred back to the respective districts for adjustment.
9. That all contracts in the bituminous field shall be declared as having automatically expired Nov. 1, 1919, and that no sectional settlement shall be allowed and new contracts must run concurrently for a period of two years in all bituminous districts under our jurisdiction.

10. That agreements negotiated for outlying districts shall be retroactive and become effective on the date upon which the agreement for the Central Competitive Field becomes effective.

11. That no agreement for the Central Competitive Field shall be concluded until after this convention has been reconvened and the agreement has been ratified by the reconvened convention, which reconvened convention shall also define a policy to be applicable to outlying districts, and that the reconvened convention shall be held in Indianapolis, Ind., on such date as may be designated by the resident international officials.

12. We recommend that in event a satisfactory wage agreement is not secured for the Central Competitive Field before Nov. 1, 1919, to replace the one now in effect, that the international officials be authorized to and are hereby instructed to call a general strike of all bituminous miners and mine workers throughout the United States, the same to become effective Nov. 1, 1919.

13. That this convention go on record as favoring the ratification of the wage demands made by the anthracite miners in their Tri-State Convention, which was held in Wilkes-Barre, Penn., from Aug. 10 to 23 inclusive, and that we pledge to the anthracite mine workers our power and influence in aiding them to the fulfillment of their demands.

NATIONALIZATION IS FAVORED

It is said that conservative leaders of the mine workers do not favor nationalization of the mines, nor entertain the hope that the miners will succeed in nationalizing American industries. They dared not, however, or at least did not protest in the miners' convention when that body unanimously adopted a resolution calling for the nationalization of the coal industry. The resolution thus adopted sets forth that coal mining is indispensable to the economic life of the nation; that the coal resources are owned by private interests; that the coal is produced for the purpose of creating profits and is accompanied by great economic waste; that the natural resources, especially coal and timber, are developed under the present system of production with a wastage of from 30 to 50 per cent.; and that therefore the coal supply should be owned by the Commonwealth and be operated by and for the people; that the present generation owes a solemn duty to posterity to protect and administer the treasures of nature; that it is the immediate duty of the American people to prevent the waste now taking place under private ownership of natural resources; and that the Government should take such steps as may be necessary to provide for the nationalization of the coal-mining industry.

THE PLUMB PLAN IS FAVORED

It was further decided to "instruct our representatives to urge in the coming conference with the representatives of the railroad workers' unions, a working alliance for the purpose of securing the adoption of the Plumb plan for the nationalization of railroads as the initial step in the fight for the principles of nationalization, with the understanding that such alliance will continue to press the issue with unabated vigor until the principles of nationalization have been extended to embrace the coal-mining industry of the nation.

"And be it further resolved that our organization, for the reasons set forth above, carry its fight for nationalization of mines into the Dominion of Canada and throw its influence wherever possible behind our members in Canada to the accomplishment of that end."



DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Prices and Wages

Letter No. 1—Kindly permit me to refer to the Foreword that appeared in *Coal Age*, Aug. 21, 1919, bearing on the question of whether prices produce wages or wages produce prices. In view of the stern legislative measures taken by the most eminent statesmen of today to restrain undue advance in values, it is not strange that popular opinion regards the present high prices of commodities as forcing labor to seek an increase of wages to enable wage earners to purchase the necessities of life.

There is, no doubt, great diversity of opinion regarding the manner in which prices and wages affect each other. Some will claim that wages dominate prices, which seems to be the opinion expressed in the Foreword to which I have referred. On the other hand, many hold the opinion that prices determine the wages of labor. I hope to see this question thoroughly discussed by readers, as it is both timely and important.

PRELIMINARY SURVEY OF THE SITUATION

It cannot be denied that simple business policy will cause a tradesman to maintain that the present high wages paid for labor are responsible for the increased prices of the commodities he sells. The interest of the producer is to keep prices in advance of wages. The question is, therefore, one that is closely associated with business interests, and we cannot blame the wage earner for holding the opinion that the high cost of living requires the advance he seeks in wages.

No great effort is required to see the trend of the writer's argument in the Foreword, when he states, "Prices were the outcome of wages," or the meaning of his prophecy that "prices must rise rather than fall." The reason he gives for this condition is that "labor trusts would not permit the reduction of the compensation paid to manual workers." It is clear that, if wages are reduced while prices remain unchanged, the profits of trade will be increased. It must be admitted, however, that no purpose is served in raising prices, knowing that labor trusts will raise wages in like proportion. Such action would continue unceasingly, to the material advantage of no one; while the ultimate effect would be to reduce the purchasing power of money, to the detriment of everyone.

No extended vision is necessary to see the loss that must result from cheap money and high prices, in the commercial transactions of a nation with a country where prices are low. Imports are encouraged and exports discouraged. It is well known that commercial prosperity depends on a country's exports exceeding its imports. In other words, the profits of trade and commerce depend on the sales exceeding the purchases.

The fact is readily recognized that both the profits of business and the wages paid for labor are regulated

by competition. Should either employers' organizations or labor trusts force their respective claims beyond the point where active and healthy competition would be destroyed, industry would be bound to suffer. The old saying holds true today, "Competition is the life of trade." It is the one factor that maintains an even balance between prices and wages and tends to keep conditions normal. Where there is no competition, prices may rise and the profits of trade increase, without the assurance of an equal increase in wages.

SUPPLY AND DEMAND FIX PRICES AND COMPETITION ACTS TO EQUALIZE

The fact must not be overlooked, however, that local and temporary circumstances may cause fluctuation in the rate of wages, just as the price of commodities will often vary on either side of the cost of production, depending on supply and demand, both in respect to labor and material. It must be remembered, also, that skilled labor will often command a wage out of proportion to the average wages of labor.

The claim that high prices produce high wages will only be rightly understood by those who realize that living conditions for the laboring classes demand that the cost of labor, in production, shall keep pace with the other elements that enter the problem. It may happen that high prices produce no effect to advance wages. For instance, prices depend on cost of production, which includes the cost of labor and material, freight charges, taxes and a fair allowance for the profits of business.

Now, an increase in the cost of any of these elements will surely boost the price of the articles produced. Thus, high prices may be due to excess profits, high freight charges, increased cost of raw material or excessive taxation; but there may be no corresponding increase in the wages paid for labor. As previously stated, supply and demand are the determining factors in every case, and equalization is brought about by competition, which serves to regulate both prices and wages in the industrial world.

WILLIAM WESNEDGE.

Ladysmith, B. C., Canada.

Wages vs. Work Hours

Letter No. 1—Having read much in *Coal Age*, in reference to "the unreasonable demands of miners for higher wages, shorter hours," etc., I wish to express my own humble opinion on the subject of wages and hours. As a miner of western Pennsylvania during the past 18 years, I can only speak from experience in this district and to which my remarks will be confined.

A visit to a few of the many large mining camps, in the Pittsburgh field of western Pennsylvania, would be sufficient to convince anyone of the necessity for improvement of the condition of coal miners, in two respects. These are not, as some would suppose, wages

and hours of labor; but hours of labor and working and living conditions in and at the mines.

The wages paid miners are high enough, provided the men could have steady work. But, during the past ten years, coal miners, in this region, have only averaged from 50 to 70 per cent. of full time. While receiving a good daily wage, the miner's yearly income is poor and wholly inadequate to enable him to live and support his family as he should.

THE WORKING DAY OF THE COAL MINES

Regarding the hours of labor, W. H. Noone, writing on "Efficiency of Mine Workers," *Coal Age*, July 31, p. 204, gives the natural division of a 24-hr. day as consisting of eight hours of labor, eight hours of recreation and enjoyment and the remaining eight hours for the much needed rest of the body. Discussing the same subject, other writers have suggested reducing the working day to six hours, and William M. Chambers, discussing the same subject, Sept. 11, p. 461, draws attention to the fact that miners, in Illinois, are often "kept underground ten and even eleven hours a day."

The condition described by Mr. Chambers is not confined to Illinois mines. In the larger mines of this district, the miner is actually held eleven hours in the mine. Although the men work but eight hours in that time, the other three hours cannot be said to be hours of either rest or recreation, but are dreary hours of waiting in which the miner must kill time in various ways that are of no advantage to him but rather a strain on his constitution and impairs his health. Without the latter, he cannot be an efficient worker. Reason demands, therefore, that the coal miner, like men in other industries, should be given full eight hours from "bank to bank."

MINERS NEED GOOD WASH-HOUSES AT THE MINE

Now, a word in regard to miners' living conditions. Before all other workers, the man who toils in a coal mine should have provided for his use a wash-house at the plant. While many other industries have adopted the wash-house plan and provided a place where their workers can wash up before going home, the coal miners of this region, for the most part, are compelled to go home in their dirty, wet clothes. Not only does this impose an extra burden on the housewife, who must either provide and furnish a place and necessary materials for the men when they come out of the mine, or permit them to wash in the kitchen; but the exposure to the weather has proved fatal to many a miner living at a distance from the mine and compelled to make the trip home in all kinds of weather in his damp and often wet working clothes.

It can be said with truth that these conditions prevailing at mines have forced a large number of the better class of workers to leave the mines and seek other employment. The policy is a shortsighted one that so many coal operators adopt by not providing good working and living conditions for their men. In closing, then, let me say that the main issue is not a question of wages, but one that calls for a better distribution of the work underground, whereby the miner will be given eight hours for recreation and enjoyment and eight hours for rest and sleep, after performing his eight hours of labor. This would lift the miner from the condition of an underground savage to that of a good American citizen.

Avella, Penn.

AUGUST CARAMAZI.

Child Labor in Mines

Letter No. 2—In connection with the interesting discussion regarding the employment of minors in and about mines the following correspondence giving a recent ruling of the Commissioner of Internal Revenue, on the Child-Labor Tax Law, a late act of Congress, will probably be of interest:

Sometimes in May last I addressed the following letter to Daniel C. Roper, Commissioner of Internal Revenue, Washington, D. C.:

Dear Sir:—We are operators of thirty-two mines in Central Pennsylvania, employing about 4,000 men. An integral part of our mine properties and leases consists of eight mining towns, thousands of acres of woodlands, farms, saw-mills, etc. We permit the widows of men who have died by reason of accident in our mines or after faithful service, to stay in our houses and we try to help them as far as possible. Sons of these widows, sometimes boys between fourteen and sixteen years of age, seek work with us, which we would like to give them, knowing that they are the sole-supporters of their mothers. We request you, therefore, to kindly inform us if we can employ boys of this age, not in mine work, but giving them healthy occupation in our real estate department, in our woodlands or on our farms. Kindly inform us if, by employing these boys for this kind of work, we would be violating the Child Labor Tax Law and become subject to the penalty of an additional tax of 10 per cent. of our net profits as provided in Section 1200 of the War-Revenue Act.

After some correspondence, giving in detail the information requested by the commissioner, I received the following letter from J. Hagerman, deputy commissioner:

Dear Sir:—We appreciate the detailed statements in your letter of July 2, and the description of the work in which you contemplate employing minors under sixteen years of age, provided that their employment will not incur your liability to taxation under the provisions of the Child Labor Tax Law, applying to mines and quarries.

You state that the employment of children in your real-estate department involves the following:

"The real-estate department has charge of the houses, woodlands, the welfare work and the recreation grounds of our company.

"We keep the roads and alleys cleaned in and about our dwelling houses, and can employ boys in cleaning up the rubbish, cutting weeds and keeping the grounds in order.

"We maintain playgrounds for the children and recreation halls etc., for the men and women, and these grounds have to be kept in order."

You also say you contemplate the work of boys as follows:

"We intend to employ boys in the woodlands, in the handling and stacking of props, mine ties, bark, etc., and in other light work along with the woodsmen employed."

The employment of minors, as described in your first statement, in cleaning up yards and alleys around dwelling houses and recreation halls owned by the coal-mining company, and in generally keeping the grounds about these buildings in order, does not come within the taxation intent of the law, even though the yards, alleys and grounds are owned by the company operating the coal mines and the names of such minors appear on the payroll of the company, always providing that such employment will not suffer or permit the minors to be in or about the mines.

The employment of boys in woodlands, as contemplated in your second statement, in the handling and stacking of props, mine ties, bark, etc., and in other light work along with the woodsmen employed, is not held to be employment in a mine, even though the woodlands are owned by the coal-mining company and the names of such boys appear on the payroll of the mining company.

However, the terms of the Child-Labor Tax Law provide that any person operating a mill, cannery, workshop,

factory or manufacturing establishment in which children under fourteen years are employed, or in which children between fourteen and sixteen years are employed or permitted to work contrary to certain specified standards as to hours, shall be subject to the tax. The law applying as thus stated, to mills covers also the cutting of timber for a sawmill as well as to all other departments connected with the operation of a sawmill. Therefore, the employment of boys in woodlands in connection with a sawmill, or whose duties take them in or about a sawmill, would come within the taxation intent of the law.

Coal Age is at liberty to publish this correspondence if it is deemed desirable.

J. P. PAYOR, Genl. Supt.,
Cresson, Penn. Pennsylvania Coal & Coke Corp.

Coal Mines in Scotland

Letter No. 1—Kindly permit me as a Scotchman, to refer to the short article that appeared in *Coal Age*, Sept. 4, p. 395, entitled "Coal Mining in France and Scotland." The article bears no name, but the writer, whoever he may be, draws his own conclusions between the managers of two coal mines that he claims to have visited, one in France and the other in Scotland. He will pardon me for saying that his remarks relating to the Scotland mine and its manager show either he has never been in Scotland, or he visited one of the wagon mines of the old school; and I want to speak a word in defense of the poor ignorant Scotch manager described by our friend in this article.

Anyone who is familiar with coal mining in Scotland will say that many of the mines are the most modern operations to be found in the world. The last mine where I worked before leaving Scotland was one of the best mines it has ever been my fortune to work in or visit. The mine hoisted 2000 tons in 8 hr., and the mine cars only held 1000 lb. each, so that there could have been no "go-as-you-please" work about the plant, as our friend would have us believe. I may add that there are shafts in Scotland, hoisting 4000 tons in 8 hr., from a depth of 2000 feet.

REQUIREMENTS IN SCOTTISH MINES

Speaking of the hemp cable, in use in the French mine, it may be of interest to know that the Department of Mines in Scotland condemned the use of hemp cables in mines, 20 years ago. Tested steel-wire cables are required and these are allowed to be used only nine months in shafts over 500 ft. and twelve months where the depth is 500 ft. or less.

In France, the article states, a shaft must be inspected once a month. But, in Scotland, the manager must examine the shaft every week; and men are employed who do nothing else but look after the shaft and hoisting equipment. This is carefully examined every shift before the men go down into the mine, the rule being strictly enforced by the Department of Mines and the mine inspectors.

Evidently, our friend does not know that the Scottish Parliament, in 1903, passed a law requiring every shaft to employ two engineers at all times. He speaks about pillars of coal being left in these mines when everyone knows that Scotland is famed for its longwall work, where all the coal is taken out on the advancing method starting from the shaft bottom. He states the Scotch manager was "hardly above the level of an ordinary hewer." It is difficult to say where he gets the term

"hewer," which is the English word for miner. The Scotch word for miner is "collier."

Speaking of managers of mines in Scotland, there are three grades; namely managers, under-managers and minebosses. It is seldom a Scotch collier ever gets above the under-manager. Most all mine managers are men with a college training and first-class mining engineers. The examinations required of candidates for managers and under-managers are as hard as any in the world required in the filling of these positions. A man cannot pass this examination, or even take the examination, unless he can run a first-motion engine.

Let me suggest, in closing, that my friend, whom I do not know and cannot address, would do well to go back to Scotland and see some real coal mines such as I am confident he has never seen.

JOHN A. DOUGLAS, Supt.,
Page, W. Va. Loop Creek Colliery Co.

Avoidable Degradation of Coal

Letter No. 1—I have been reading with great interest the article of Benedict Shubart, *Coal Age*, Sept. 4, p. 401, in which he discusses the avoidable degradation, or reduction in sizes, produced in the preparation of coal for the market. This is an exceedingly interesting and important subject for discussion, as there are many factors that enter into the problem, and the trouble is not all due to the style of equipment employed for loading the coal, on the surface.

At the present time, it is my duty to study the conditions under which the miner is performing his work, with a view to selecting the kind of explosive he should use and instructing him how to place his shots so as to secure the best results and produce a larger percentage of lump coal. Observation convinces me that conditions at the working face are responsible for much of the degradation of the coal, although I will not deny that the manner of preparing, loading and transporting the coal, both in the mine and on the surface, plays an important part in reducing the size of the coal before it reaches the market. The point I would emphasize, however, is that more attention should be given to the manner of blasting the coal, especially where it is the practice to blast off the solid, as it is in the anthracite region.

START IMPROVEMENTS AT THE BOTTOM, COÖPERATION NEEDED

Strange as it may seem the average coal operator appears to prefer to start from the outside when attempting to improve conditions in his business. Far better results would be accomplished if the work of improvement was to commence at the other end. "Start at the bottom" is my motto. It will often be found that 90 per cent. of the difficulties that lower the standard and quality of the coal arise from the lack of coöperation between those in charge of the work underground and on the surface.

There should always be a common aim and understanding of what is required. When the outside foreman complains that miners are sending out dirty coal, he should not be met with some reply tending to throw the blame on the man outside. Again, when large pieces of coal are loaded by miners, the complaint is often heard that too much time is required to break up the pieces or to get them out of the car. It would

seem that both the inside and outside foremen should get together for the purpose of producing the best results possible.

However, as I said before, more attention should be given to the miner, who must be taught to use more judgment and skill in the performance of his work. Blasting coal is a science that should be carefully studied. The charge of powder must be in proportion to its work. If the charge is too deeply laid poor results will be secured; and on the other hand, too light a shot will pulverize the coal and give equally poor results. Judgment and experience are required for the work of blasting.

PLAN OF MINE AND METHODS OF WORKING LARGELY RESPONSIBLE FOR EXCESSIVE BREAKAGE

In the matter of securing more of the larger sizes of coal for the market, it is necessary to go further back in the development, and study the conditions that should determine the laying out of a mine and the method of working to be employed that will give the desired results. In the bituminous field, especially, the direction of driving the entries and rooms must be largely determined by the vertical cleavages of the coal, the inclination of the seam and the extent of the basin or property to be worked.

The room-and-pillar system of mining should not be employed where longwall will give better results. In longwall work, there is a great advantage in keeping the line of the working face parallel to the cleats in the coal. The careful study of these conditions, in the laying out of a mine, will often produce surprising results.

An important feature in reducing the amount of breakage, in the handling and loading of coal at the face, is the distance the coal must be shoveled or otherwise handled before it can be loaded into the car. On this account, the driving of chambers at a great width is often a serious disadvantage, because of the distance the coal must be handled to get it to the car where it can be loaded. To lessen the work of shoveling, it is very common practice, in the anthracite region, for a miner to arrange his shots so as to throw the coal toward the roadway. Where coal is mined on steep pitches much breakage is caused by loading the coal from chutes, and this will depend very much on the height of mine car used.

HANDLING THE COAL FROM THE FACE TO THE DUMP

When one follows the coal, from the time it is blasted out of the solid until it reaches the tippie, passes through the breaker and is finally loaded into the railroad car, he is often led to wonder that the percentage of large coal is not much less than the actual. By the application of modern machinery, great strides have been made, in recent years, in the economical handling of the products of our mines; and yet there is room for improvement all along the line.

I can remember when, some years ago, in a mine in South Wales, supposed to be one of the most up-to-date operations in Great Britain, it was forbidden to load coal with the shovel. Each miner was furnished with two sheet-iron boxes, and we had to get down on our knees and scoop the coal into these boxes with our hands. Notwithstanding all this, when the coal reached the tippie it was placed in a rotary dump that stood about 10 ft. over a perforated transit.

At that time, everything that went through the 2-in. perforations was deducted from the miner's gross weight. The process was known as the "Billy Fairplay." Under the conditions prevailing there, it was not unusual for a miner to load from 15 to 20 tons of coal for which he received no pay. I could never find out where the "Fairplay" came in, unless it referred to the operator's side of the question. RICHARD BOWEN.

West Pittston, Penn.

Safety in Mine Timbering

Letter No. 6—Kindly permit me to offer a few comments on the letter of "Mine Foreman," *Coal Age*, Aug. 28, p. 378, in which he seems to favor the suggestion made by someone, previously, to the effect that illustrations of the right and wrong methods of timbering should be made and posted where men could study them. He adds, "This would impress on many the way in which accidents often occur from improper timbering."

To my way of thinking, it might be all right to do this if it were possible to timber every place the same way. It is well known, however, that conditions make it necessary to adopt different ways of timbering, and these can be learned only by actual practice. Before a man can become a practical timberman, he must be a certified miner.

EMPLOYMENT OF UNCERTIFIED MEN AS TIMBERMEN AND FACEBOSSES CONDEMNED

Under the mining law of Illinois, a man can secure a certificate as miner only by passing an examination before the Miners' Examining Board to show his knowledge of coal mining and the laws governing the work. In my judgment, no one but a certified miner is qualified to act as timberman. In no case should an uncertified miner be permitted to timber places where his own safety and that of other men depend on his work.

It is true that many facebosses are men who have started as trapperboys, later driving mules or running motors and finally reaching a position of driverboss and then faceboss. It appears to me, however, that the employment of a man as faceboss who is not a certified miner is a practical violation of the state mining law, inasmuch as he will have to direct the work and be responsible for the safety of certified men mining the coal under his supervision. The faceboss may have a man under him who is no better than himself in respect to his knowledge of setting timbers and may send him to timber a place for machinemen whose lives are thus placed in his hands. Their safety depends on the way the work is performed.

After an experience of 24 years in the mines as miner, driver, trackman, timberman, mine examiner and mineboss (foreman) I will say that safety in mine timbering can be brought to the highest standard only by the employment of practical men who possess the sense of honor to be fully qualified as certified men, before attempting such work.

Speaking of a squeeze occurring in a mine, my opinion is that it makes little difference what material is used to timber the workings if the pillars in the mine are not large enough and strong enough to support the overlying strata. If the bottom is soft and the great pressure on the pillars causes it to heave no amount of timber of any kind can stop it when it has once started.

My idea is, therefore, that the way in which the work is performed is of more importance than the material used in timbering. All depends on the knowledge of the mine manager (foreman), who must employ competent men and see that the work is done in a substantial and workmanlike manner.

TIMBER AGREEMENT BETWEEN SUPERINTENDENT AND MINE INSPECTOR UNFAIR TO FOREMAN

Regarding the superintendent and mine inspector making a fixed agreement in respect to the timbering of a mine, it is my opinion that such an agreement would be unfair to the mine manager (foreman). In many cases, it will happen that the superintendent is a man who has worked up to his present position from that of a clerk in the office and who possesses only a theoretical knowledge of mining.

The mine manager is the man who is responsible for the lives of the men working in the mine. If he is a practical man, a certified miner who has passed his examination and proved his ability to take charge of a mine, he will not need a fixed rule for timbering, but will be guided solely by his own judgment and employ only certified men in the work of timbering.

Harrisburg, Ill.

G. D. YORK.

Unpractical Examination Questions

Letter No. 8—Some time since I was looking over the issue of *Coal Age* for July 24, and my attention was arrested by the second question given on page 165 of that issue. The question asked for the dimensions of two airways having equal perimeters, the area of one being half again as large as that of the other.

While I do not ordinarily bother over such questions, this one seemed so simple that I started to work it out. I drew many diagrams of different forms, computing the area and perimeter of each.

After some time and labor, I found that a rectangular airway 6 x 9 ft., in section, had the same perimeter as one 3 x 12 ft., in section, the perimeter in each case being 30 ft. Also, the area of the first airway, $6 \times 9 = 54$ sq.ft., is half again as large as that of the second airway, $3 \times 12 = 36$ sq.ft.; thus, $36 \times 1\frac{1}{2} = 54$.

This did not and does not appeal to me, however, as a practical solution of the question, and I was pleased to see the solutions that were given later in *Coal Age*, Aug. 28, pp. 374 and 375. The last one given by Dave Hunter I believe is the most simple and practical solution that can be offered in answer to such a question.

Seneca, Ill.

A. M. BROWN, JR.

Bolshevism in America

Letter No. 4—It is with much pleasure and satisfaction that I have read the letters on this subject that have appeared recently in *Coal Age*, and want to express the hope that the intelligent opinions expressed in these letters will have the effect of arousing the true citizens of America and cause them to mobilize in a manner to counteract the already mobilized Bolshevik forces in this country. Until this is done there will be no end of labor troubles that prevail today, not only here, but throughout the world.

In the mining region, especially, Bolshevism is the topic of the day. In my opinion, our coal producing centers are the homes of many Bolshevik agitators and

followers. The latter are not generally animated by an intelligent desire for these doctrines, but, through their lack of intelligence, they allow themselves to be led by men who preach force and violence. Not a few already recognize that they have lowered their standard of living and not improved their conditions.

It is little wonder that the cost of living today is high, when workers all over the country are demanding high wages and shorter hours. It would seem that these workers think that the capital invested in the various industries is making such enormous profit that there can be no limit to their own demands. But, it must be remembered that to satisfy these demands of organized labor, it is necessary for producers to increase the cost of their products, and the result is no advantage to the consumer. In other words, stress, threats and violence are not the remedy for the high cost of living.

STRIKES PROVE COSTLY TO ALL CONCERNED

The cost of a strike to the workers is not considered by the men who advise such a course, who do not stop to think whether men dependent on their daily wage can stand a week or a month of idleness. If such statistics were available, they would show that many a child and mother have lived in want because the breadwinner would not or could not stand the disgrace of being called an "unfair workman," or "scab."

Strikers in all industries overlook the important fact that when a few hundred or thousand men walk out on strike, thousands of their countrymen suffer loss by being obliged to pay more for the necessities of life because production is curtailed. The more intelligent of men realize that the act of strikers is not confined in its effects to themselves, but is felt by a large community of people who are dependent on the products of their labor. Knowing this, it is the duty of every broad-minded citizen to cooperate with the Government in its efforts to adjust differences and restore the country to normal conditions. There is but one way to settle these existing difficulties, and that is for workers to cooperate with their employers for the welfare of the general public.

CAUSE FOR DECLINE IN MONEY VALUE

It is quite true that the purchasing value of a dollar has grown rapidly less in the past few years, till it is scarcely more than one-half of what it was formerly. The principal cause for this condition can be traced to so large a class of workers who have fallen victims to Bolshevik activities.

Is it not high time that industrial workers in this country realized that the President has started a battle to reduce the high cost of living, but that he is helpless to gain this end if they themselves continue to demand higher wages which can only force still higher the cost of life's necessities? Let us, then, get together in an honest effort to restore normal conditions, which alone can bring the dollar back to its original value. Let us recognize that there is no American principle in the Bolshevik plan, which started in a foreign country and is now sowing its seeds of discontent in our own land. It is the duty of every honest worker to uncover and condemn whatever has the appearance of Bolshevism. By this means only can we insure its failure and come to enjoy the blessings that are ours.

Plymouth, Penn.

JOSEPH R. THOMAS.



INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Calculating Air Splits

Explain the method of calculating the natural division of 15,000 cu.ft. of air in the following three splits:

Split A,	6 x 10 ft.,	4000 ft. long;
Split B,	5 x 12 ft.,	6000 ft. long;
Split C,	5 x 8 ft.,	3500 ft. long.

West Terre Haute, Ind

STUDENT.

These three airways have the following respective lengths, perimeters and areas:

	Size	Length	Perimeter	Area
A,	6 x 10 ft.,	4000 ft.	32 ft.	60 sq. ft.
B,	5 x 12 ft.,	6000 ft.	34 ft.	60 sq. ft.
C,	5 x 8 ft.	3500 ft.	26 ft.	40 sq. ft.

It shortens the operation to take the relative lengths, perimeters and areas, by cancelling the common factors in each, as follows: The relative lengths are 8, 12, 7; perimeters, 32, 34, 25; and areas, 3, 3, 2.

A,	$a\sqrt{\frac{a}{lo}} = 3\sqrt{\frac{3}{8 \times 32}} = 0.325$	$\frac{325}{792} \times 15,000 = 6155$ cu.ft.
B,	$= 3\sqrt{\frac{3}{12 \times 34}} = 0.257$	$\frac{257}{792} \times 15,000 = 4868$ cu.ft.
C,	$= 2\sqrt{\frac{2}{7 \times 26}} = 0.210$	$\frac{210}{792} \times 15,000 = 3977$ cu.ft.
Sum of potentials . . . 0.792		Total . . . 15,000 cu.ft.

Resistance of Mine-Track Curves

Kindly permit me to ask if there is any reliable formula or method of calculating the resistance due to a curve in the track, on a mine haulage road. We have one or two fairly sharp curves, on the main road in our mine, and I am interested in estimating, as nearly as possible, what is the resistance due to these curves.

—, Penn.

MINE ENGINEER.

The resistance due to curves, in mine haulage, can only be estimated approximately. The chief factors on which it depends are the following: Gross weight hauled, wheelbase of cars or motor and the degree of curve or radius of curvature of the track.

Experiment has shown that the unit resistance of curves, or the resistance, in pounds per ton, per degree of curve, decreases as the gross weight hauled increases. Thus, the resistance per ton when hauling a single car was found to be two or three times greater than when hauling a train of cars, over the same road and on the same curve.

In railroad practice on the surface, a fair average resistance, per ton per degree of curve, is assumed as 0.8 lb. In mining practice, however, when hauling over a well-ballasted road in good condition, the resistance per ton per degree of curve is less, chiefly due to the shorter wheelbase of the mine cars, which seldom exceeds 3 feet.

In mining practice, it is usual to estimate on the radius of curve, instead of the degree of curve.

A rule that is sometimes used to determine the resistance of mine-track curves is the following: Multiply one-fifth of the gross weight hauled (W), in pounds, by the wheelbase (B), in feet, and divide that product by the radius of the curve (R), in feet; thus,

$$R = \frac{BW}{5R}$$

When hauling a train of 20 or 25 cars, the constant (5), in this formula, may have a value of 6 or 7, depending on conditions that tend to decrease the resistance, such as excellent track, good rolling stock and relative number of cars making up the trip.

Sparking of Electric Motors

We have a four-pole, Imperial Electric Co. motor running our conveyor line which gives us quite a lot of trouble. The brushes spark and the commutator stays hot. The commutator has 109 segments and I wish to ask how the brushes should be placed to obtain the best results. The ring to which the brush holders are attached is stationary and I do not think, therefore, that the trouble could be from the brushes working too far forward or backward on the commutator.

—, W. Va.

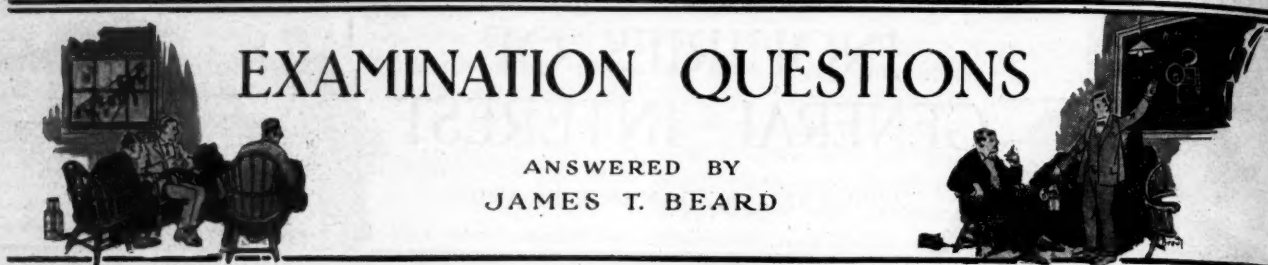
SUPERINTENDENT.

It would be difficult, if not impossible, to suggest the real cause and remedy for the sparking of the brushes on the motor mentioned by this correspondent. We do not recognize the name given in the inquiry and are unfamiliar with the type of motor mentioned. For this reason, we would advise direct correspondence with the manufacturer of the machine, who may be able to suggest the proper remedy.

As is well known, there are different types of brushes adapted to different services, depending largely on the speed of the motor and conditions surrounding its operation. Sparking at the brushes is very frequently caused by the overloading of the motor, which may be the case in this instance. Again, the brushes may not be adjusted properly.

If the motor is overloaded, the sparking may be somewhat lessened but cannot be wholly eliminated by shifting the brushes a little back on the motor. Anything that will cause the brushes to jump on the commutator, such as one or more high bars, rough surface or dirty brushes, eccentricity, or a sprung armature shaft, too high speed, etc., will cause sparking at the brushes.

The actual cause of the sparking, in any particular case, can only be determined and remedied by a careful inspection and familiarity with the machine. We would advise, also, correspondence with reliable manufacturers of brushes, who will generally be able to recommend a suitable type of brush to avoid the difficulty.



EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Miscellaneous Questions

(Answered by Request)

Ques.—If 40,000 cu.ft. per min. passes through an airway 9 x 6 ft. in section, what is the length of one side of a square airway through which 10,000 cu.ft. per min. will pass under the same pressure?

Ans.—For the same length of airway and unit pressure, the square of the quantity varies inversely as the perimeter of the airway and directly as the cube of its sectional area. Hence, the square of the quantity ratio is equal to the inverse perimeter ratio, times the cube of the area ratio. In this case, the perimeter and sectional area of the first airway are $2(6 + 9) = 30$ ft. and $6 \times 9 = 54$ sq.ft., respectively. Also calling one side of the square airway s , its perimeter and sectional area are $4s$ and s^2 , respectively. The quantity ratio, in this case, is 4 : 1, and we write,

$$\left(\frac{4}{1}\right)^2 = \frac{4s}{30} \times \left(\frac{54}{s^2}\right)^3$$

which gives for the value of s

$$s^6 = \frac{4 \times 54^3}{4^3 \times 30} = \frac{54^3}{120} = 1312.2$$

$$s = \sqrt[6]{1312.2} = 4.2 \text{ ft.}$$

Hence, the side of a square airway that will pass 10,000 cu.ft. per min., under the same pressure that a 6×9 ft. airway of the same length will pass 40,000 cu.ft. per min., is 4.2 ft., and its sectional area is $4.2^2 = 17.64$ sq.ft.

Ques.—From the following data find the theoretical water gage: A fan driven by two coupled engines having cylinders 18 in. in diameter, length of stroke, 42 in., number of strokes per minute, 50, mean effective pressure, 16.8 lb. per sq.in., and developing 80 i.hp. is circulating 144,055 cu.ft. of air per min., and producing an actual water gage of 3 in. in the fan drift.

Ans.—Something is wrong in the statement of this question, as the indicated horsepower of a duplex 18 x 42-in. engine, making 50 strokes a minute, under a mean effective steam pressure of 16.8 lb. per sq. in., would develop a power of only

$$H = \frac{2 \times 16.8(0.7854 \times 18^2)3\frac{1}{2} \times 50}{33,000} = 45\frac{1}{2} \text{ i.hp.}$$

But the effective power on the air, in the circulation of 144,055 cu.ft. of air against a 3-in. water gage is,

$$H = \frac{144,055(3 \times 5.2)}{33,000} = 68 + \text{hp.}$$

Even assuming that, as the question states, the engine is developing 80 i.hp. in driving the fan, it is then only possible to estimate the *mechanical* efficiency of the fan and engine combined, which is $(100 \times 68) \div 80 = 85$ per cent. But, to find the theoretical water gage from

the 3-in. gage effective in the fan drift, it is necessary to know the *manometric* efficiency, or the ratio of the effective to the theoretical pressure of gage, which is not the same as the mechanical efficiency found above.

Ques.—(a) What are the causes of creep and squeeze? (b) How would you guard against them? (c) How would you proceed to stop them?

Ans.—(a) A squeeze or creep occurring in a mine is the result of leaving insufficient pillar support. In other words, the pillars are too small for the depth of cover and thickness and strength of the coal, in the seam worked. The excessive roof pressure tends either to crush the coal or force the pillars into the soft bottom, causing it to heave. Either of these conditions is known as "squeeze or creep," in mining.

(b) To guard against the occurrence of squeeze or creep, it is necessary to leave adequate pillars to support the roof and take necessary precautions to prevent the heaving of a soft bottom. If the bottom is fireclay, it must be kept as dry as possible by providing good drainage.

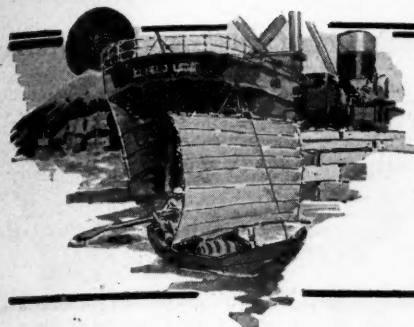
(c) The most effective means of arresting a squeeze is to start a good fall of roof in the waste, and push the rapid extraction of pillars in adjoining sections of the mine.

Ques.—(a) How would you proceed to rescue men remaining in a mine after an explosion? (b) What difficulties would you be likely to encounter and how would you overcome them?

Ans.—(a) Call for volunteers and select from these the most experienced men and those familiar with the mine. Where trained rescue teams are available, these are given preference. Examine and make any needed temporary repairs to the ventilating apparatus. Organize two rescue parties, placing each in charge of a competent leader. Equip these men with safety lamps and all necessary tools and other supplies.

Enter the mine on the intake air, the men equipped with breathing apparatus going ahead as exploring parties, advancing as rapidly as possible but not faster than the air. The second or follow-up party makes necessary repairs, erecting brattices where these are wanted to carry the air forward and restore the circulation as rapidly as possible. In this manner each section of the mine must be explored and every effort made to rescue the men entombed in the workings.

(b) The difficulties to be encountered consist mainly in the lack of air circulating in the mine following an explosion, owing to doors and stoppings having been blown down and the means of ventilation destroyed by the blast. The passageways are filled with debris, timbers and fallen roof, broken cars and twisted iron, making progress slow and dangerous. Also the afterdamp that fills the mine is irrespirable and poisonous. These difficulties must be overcome by doing everything to restore the circulation of air and to remove the accumulated gases and the numerous obstructions in the roads and passageways.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS



European Coal Situation

Reports Received From Consular Officers Abroad Show That the Need for Fuel Is Urgent and That the Time Is Ripe for American Coal to Obtain a Footing in Foreign Markets

GERMAN AUSTRIA

Consul General Albert Halstead,
Vienna, July 22

The figures quoted below were furnished by the correspondent for German Austria and Hungary of a prominent American newspaper, and, while unofficial, are believed to be accurate:

"As a result of the revolution German Austria lost all its sources of coal supply. Only 5000 tons per day—that is, 12 per cent. of the coal required in 1913 for railway, industrial and household purposes—is now produced in German Austria; 88 per cent. must be imported. As the German Austria coal is of a poor quality, the 12 per cent. must be reduced to 6 per cent. One of the activities most affected is the railroads.

"The German Austrian railroads made agreements with neighboring states for the supply of 177,890 tons of coal per month, but these promises have been fulfilled only to the extent of 109,650 tons per month, or 62 per cent. of the quantity agreed upon. Because of the small importations, the coal produced within the country has had to be used for various industries, and the 30,250 tons per month that usually were secured by the railroads from this source have been reduced to 26,800 tons.

"The railroads require 166,500 tons of coal per month, whereas the total amount which they now have is the 109,650 tons from foreign sources plus 26,800 tons from their own mines, making only 136,450 tons per month, or about 30,000 tons less than their requirements. The railroads say they ought to have a stock of 400,000 tons on hand, whereas they have only 32,200, or coal sufficient for about five days.

"The electric light and power plant in Vienna is so hard pressed for coal that a few days ago it found itself on the verge of being compelled to shut down. It called on the railroads in this emergency, and the railroads loaned the plant 5000 tons. At this time the electric light and power plant had on hand only 1500 tons of coal, or less than two days' supply. At the corresponding date in 1918 the plant had 40,000 tons of coal. The consumption of coal by the electric-light plant, even with its present greatly reduced service, is 800 tons per day, but on account of strikes in foreign mines and for other reasons the actual delivery of coal is brought down to 300 tons per day.

"The gas works of Vienna had on July 15 of this year a supply of only 26,000 tons of coal. On the corresponding date last year it had on hand 126,000 tons of coal. The electric plant on July 15, 1918, had a stock of 44,000 tons of coal, and on July 15 of this year it had only 2000 tons of coal on hand; four days later, July 19, its reserve was down to 1500 tons, or a loss of 500 tons in four days.

"It has been necessary to close the Vienna belt railway, part subway and part elevated, for lack of coal, and railway service during the war has been reduced to about 24 per cent. of the service in 1914."

It will be observed that the foregoing statement does not deal with the quantities of coal required for industries. This would be very much more than that needed by the various city undertakings. It will be further observed that the coal required for heating private dwellings is not taken into consideration. Without coal for the industries, industrial unrest must be augmented; without coal for the household, life in winter will be well-nigh intolerable. The lack of fuel in Austria is serious.

DENMARK

Trade Commissioner Thormod O. Klath,
Copenhagen, July 14, 1919.

Throughout the war period Denmark had great difficulty in keeping up its fuel supply, and for some time many of the less essential industries were forced to close down. By practicing the strictest economy, however, supplemented by Government regulation and distribution of the supplies received, it was possible to get along. The imports gradually became less as the war continued, until at the end of 1918 the lowest point was reached.

The normal annual coal requirements of Denmark amount to over 3,000,000 tons, all of which must be imported, as there are no coal mines in the country. Of this amount the gas plants consume approximately 600,000 tons; electrical plants, 100,000; industrial plants, 1,500,000; railroads 550,000; and household and miscellaneous uses about 250,000. Approximately 750,000 tons of coke are used annually, mostly for heating houses, of which 400,000 tons are imported and 350,000 tons produced by the Danish gas plants.

The following table shows (in metric tons of 2204.6 lb.) the imports of coal, coke and fuel briquets into Denmark for the years 1913 to 1918 inclusive, and the principal exporting countries:

Articles and Countries	1913	1914	1915	1916	1917	1918
Coal:						
Germany.....	189,211	131,321	109,715	508,115	644,058	687,101
United Kingdom—						
England.....	1,494,693	1,615,180	1,605,553	1,046,372	424,076	557,414
Scotland.....	1,401,293	1,374,762	1,469,452	1,197,851	388,320	494,910
Wales.....	32,057	54,157	39,860	48,105	11,103	9,415
Other countries.....	32,272	48,961	6,129	11,679	5,108	2,400
Total, coal.....	3,149,526	3,224,381	3,230,709	2,812,122	1,472,665	1,751,240
Coke.....	275,270	248,645	449,626	647,319	465,642	360,081
Briquets.....	148,557	139,455	183,647	245,366	187,505	117,561

It will be seen that the United Kingdom has been the chief source of Denmark's coal imports, and about 90 per cent. of the coke imported has also come from the United Kingdom. Germany has been next in importance in supplying coal. Especially during the last years Germany has sent a large amount of coal to Denmark to help pay for the foodstuffs from Denmark. The German coal in a measure also aided in keeping up the exchange rates between these two countries.

Early in the war, when the coal shortage first became felt, the Government laid down very strict rules looking to the conservation of coal. Street lighting was cut down to the minimum, the number of street cars was reduced, and fuel for household use was rationed. Electric current for lighting houses and stores was charged for at increased rates if more than the minimum quantity was used, and the same was true of gas. Stores and other places of business were compelled to close at an early hour to save fuel, and restaurants were allowed to serve hot dishes only between certain hours. All superfluous lighting of theaters was discontinued, and all theaters had to be closed by 10 o'clock. Practically all of these regulations were continued throughout the war and are still in effect in all parts of Denmark.

There are deposits of peat in various sections of Jutland (the continental portion of Denmark), and on the different islands. The total peat area has been estimated at 62,000 square miles. If an amount of peat were used annually equivalent to the heat value of 4,000,000 tons of bituminous coal,

this supply would meet all of Denmark's fuel requirements for about 37 years. The lack of coal stimulated peat production, and 397,800 tons were produced in 1917, as compared with 285,000 tons in 1916.

Two tons of dried and prepared peat have approximately the same heat value as one ton of ordinary coal. However, peat is so bulky that it is difficult and wasteful to handle, and even though the original cost of peat is less than coal the final cost, after handling, is about the same as that of imported coal.

Peat has been used principally for domestic heating purposes, but also to some extent in industrial plants and as locomotive fuel. In many places the gas plants have been experimenting with peat in producing illuminating gas, but the consumption for this use has not been large. If the use of peat by the gas plants is developed to any extent, the production of coal-tar products, ammonia, etc., will undoubtedly form valuable byproducts.

About a year ago, the Danish Government fixed the maximum price of peat at \$7 per ton at the moor and \$8.60 per ton loaded in freight cars f.o.b. the seller's nearest railway station. The Government has done all in its power to encourage the production of peat and has given some financial assistance in the form of loans at low interest rates to producers. In 1917 there were in operation over 200 peat works that were partially supported by the Government.

The results obtained from peat fuel have been far more satisfactory. The large increase in peat production has been due chiefly to price-fixing by the Government and to other aid extended. These measures were taken, of course, to provide fuel for the country in an emergency, and when coal at a lower price and in sufficient

quantities is again on the market the peat production will undoubtedly go back to its old basis.

The following figures show the output and number of factories producing machine-made peat in Denmark for certain years, the sudden increases for 1916 and 1917 being due to efforts to replace the usual supply of imported coal shut out by the war:

Year	Factories, Number	Output, Tons
1902.....	39	46,760
1907.....	53	63,948
1912.....	90	84,788
1914.....	97	86,849
1915.....	99	95,145
1916.....	204	285,000
1917.....	747	397,846

Brown coal (lignite) is a comparatively new product in Denmark, it having recently been discovered in Jutland. It is very similar to the brown coal found in many parts of Germany, although its heat value is said to be much less. Brown coal has been used extensively for a number of years in Germany, where it is found in large quantities and is of good quality. As fuel in the German glass industry, which is located near the brown-coal deposits, it has been of much importance. The use of brown coal in Denmark, however, will always be insignificant. Its greatest value will be for use in cement factories near the deposits in Jutland and for making fuel briquets in combination with peat and coal tar.

Normally about 315,000 tons of wood

are cut for fuel, equivalent in heat value to about 150,000 tons of coal. During the autumn of 1916 and the spring of 1917 about 765,000 tons of wood fuel were cut, due to the urgent demand. The cut will have to be reduced in the future, however, in order to keep up the scant forests of the country. During the coal scarcity large amounts of wood to be used as fuel were imported from Sweden and Norway.

The foregoing shows the conditions of the Danish fuel supply at the end of the war, and since the signing of the armistice conditions have not improved. The quantity of coal received from Germany has dropped to almost nothing, and great difficulty has been encountered in obtaining English coal. The English market is the largest source of supply at present, but even though Danish importers send their own ships to England, endless delays are met before the vessels can be loaded and return with cargoes. Sometimes a ship must wait three or even four weeks in the English ports before it can be loaded with coal.

As a result Danish coal importers have been looking to the United States as a possible source of supply. Orders to the amount of two or three hundred thousand tons have already been placed in the United States, a large part of which is for the use of the Danish Government railways. This American coal costs from \$28 to \$30 per ton c.i.f. Danish ports.

After considerable delay and many difficulties in obtaining shipping, a coal company of Copenhagen has succeeded in bringing to Denmark the first boatload of American coal that has ever been landed here. The first steamer arrived at Aarhus the latter part of June, and the second ship has just arrived at Copenhagen. There has been some question as to the quality of the American coal, but this doubt has already been dispelled. The manager of a local importing company stated that in his opinion the American coal is equal to, if not better than, the best English coal.

So long as the English and German coal is so scarce and so expensive, there is an opportunity for the United States to supply coal to Denmark. However, when conditions become nearer to normal in these two exporting countries, it is doubtful whether the American product can compete because of high freights.

It is undoubtedly true that American shipping could be more profitably employed than in carrying coal over the Atlantic to supply the factories and railways of Europe. This is especially true when the ships must return to the United States with little or no freight. The ideal situation, of course, would be to send cargoes of manufactured goods to supply the numerous wants of these countries.

If American coal is to be sent to Denmark or other Scandinavian country permanently, the American coal-exporting companies should take over some of the larger coal concerns operating at the principal ports. The coal could be used as bunkers for American ships in this part of the world. There would then be no need for American ships to rely on foreign bunker coal, as is now the case, and the control that foreign countries now exercise over American shipping would be entirely removed. This matter is worthy of serious consideration by American shipping and coal interests.

ITALY

Trade Commissioner H. C. MacLean,
Rome, July 28, 1919.

An industrial nation without coal is helpless, yet that is the situation which confronts Italy at the present moment. Italy has been accustomed to import practically all its coal from England, and England now finds itself unable to continue this supply as heretofore.

The Italian Minister of Transportation, speaking before the Chamber of Deputies on July 26, stated that the stocks of coal on hand for the railroads and navy were sufficient only for 14 days, including that on vessels being unloaded, in lighters, and on docks. Industry and transportation are so interdependent that the one can not be deprived of coal to benefit the other, yet Italy's supply of coal will not permit both to operate to the customary extent.

The production of coal in England has decreased to a point where it is predicted that there will remain only a surplus of 15,000,000 tons per annum. Instead of the 77,000,000 tons formerly exported, England has been obliged to limit the exports of coal to Italy to about 330,000 tons per month, for both private and Government account, which is less than one-half the quantity expected. On top of this has come notice that for the time being, at least, all shipments must be suspended.

Belgium, which furnished Italy about 20,000 tons per month, has prohibited the ex-

portation of coal. Imports from France have been insufficient to afford any relief. Germany can supply Italy only after the requirements of France have been taken care of, which leaves Italy little basis for hope in this direction.

All eyes are turned toward the United States as the only country with a sufficient production to cope with the situation, but the shortage of tonnage has so far prevented the movement of adequate quantities of coal. By sending its own vessels, Italy has succeeded in assuring the shipment of 102,000 tons of American coal in July, as compared with 67,000 tons in June, and every effort is being made to provide additional tonnage. However, the difficulty in arranging credits to cover purchases and the extreme depreciation of the Italian lira abroad increase the difficulties already existing.

The following figures show Italy's imports of coal from 1913 to date, in metric tons of 2204.6 pounds:

Year	From United States	From England	From France	From Germany	From Other Countries	Total Imports
1913.....	92,000	9,397,000	162,000	968,000	215,000	10,834,000
1914.....	292,000	8,485,000	67,000	.....	915,000	9,759,000
1915.....	1,742,000	6,090,000	25,000	.....	512,000	8,369,000
1916.....	1,057,000	6,997,000	4,000	.....	7,000	8,065,000
1917.....	451,000	4,563,000	20,000	.....	3,000	5,037,000
1918.....	47,000	4,322,000	1,467,000	.....	5,000	5,840,000
1919 (6 months).....	138,000	2,662,000	197,000	.....	54,000	2,996,000

Since 1916, it will be noted, Italy has been receiving only about one-half of the amount of coal normally consumed. Unless imports can be increased to approximately pre-war figures, the quick reconstitution of Italian industry, which is a matter of such vital importance to the country at the present time, will be impossible.

Under existing conditions it has even been found necessary to adopt measures to reduce even the present limited consumption of coal. At a meeting held on July 28 the Ministry of Transportation decided to further limit the passenger service on the railroads as well as on certain navigation lines. New trains, which had been added during the past few months but which are not absolutely indispensable, will be withdrawn Aug. 1. It was also feared that it would be necessary to limit the consumption of gas, but for the time being such action will not be taken.

SPAIN

Commercial Attaché Chester Lloyd Jones,
Madrid, June 28, 1919.

Heretofore the dependence of Spain on Great Britain for coal has extended even to the supply of the army and the national arsenals. An effort is being made this year to use the national product in these establishments, according to a report recently made by the president of the Commission for the Study of Coal Resources. A decision to rely on the local product would have at the present time a social as well as an industrial bearing, inasmuch as many of the mines have large stocks of coal on hand, and if public purchases were not arranged there would arise labor troubles because of the necessity of closing down many of the works. It is urged also that transportation conditions are at present more favorable than in the winter, and that therefore it would be advisable for the Government to accumulate at this time a supply of the coal needed for its activities.

To carry out these objects the Minister of Abastecimientos (supplies) recently issued two royal orders directed to the Minister of War and the Minister of Marine asking that they state the amount of coal which they feel it would be advisable to have in storage for the use of their departments for a period of six or eight months. By another royal order on June 28 a similar request was addressed to the Departments of Fomento (promotion), Public Instruction, Treasury, State, and Justice. Coal dealers and individual consumers are urged to place their orders at once with the mines, and the Ministry of Abastecimientos gives the assurance that it will aid by all means in its power the efforts to avoid a coal famine such as occurred during the past winter.

The prices for foreign coal show some tendency to fall due to the receipt of cargoes from Great Britain. Cardiff nut coal is quoted in Barcelona at 175 pesetas a ton, sea coal at 170, cobbles anthracite at 234, Newcastle at 185. [The normal exchange value of the Spanish peseta is 80.193.]

Coal exists in many parts of Persia and is at present being worked in at least two localities. Tabriz is supplied with coal from a neighboring mine, and Teheran coal has to a large extent taken the place of wood as fuel.

Foreign Coal Trade Opportunity

A company in England desires to purchase coal in any quantity and quality available. Quotations should be given c.i.f. Liverpool and London. Reference. The address may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its district and co-operative offices. Refer to File No. 30,693.

Exports of Coal from Newcastle, Australia

Coal exported from Newcastle to points beyond the State of New South Wales for the period of six months ended June 30, 1919, states a recent consular report, amounted to 1,355,492 tons, which is a decrease of 343,829 tons from the 1,699,321 tons shipped during the corresponding period of 1918. A considerable proportion

of the falling off of the interstate trade may be attributed to the strike of the coast-wise seamen.

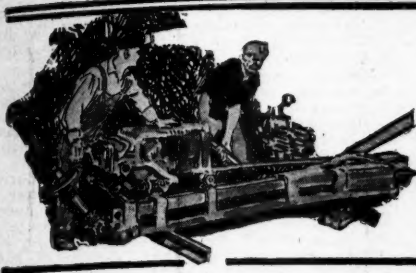
The amount shipped includes bunker coal, and in many cases the amount mentioned as being exported to a particular destination may have comprised simply the bunker coal required by the vessel to proceed to that port. The following table gives the relative amounts and destination of the coal shipments for the two periods mentioned:

Destination	Six Months Ended	
	1918 Tons	1919 Tons
Victoria.....	695,491	485,828
South Australia.....	481,859	279,182
West Australia.....	44,210	63,267
Queensland.....	62,080	27,026
Tasmania.....	50,890	25,675
New Zealand.....	165,323	195,747
Sandwich Islands.....	1,200	27,850
Philippine Islands.....	11,850	9,477
Chile.....	2,414	17,450
United States.....	9,260	4,022
Noumea.....	11,421	12,717
Nauru.....	5,625	3,710
India.....	33,975	7,189
Society Islands.....	14,312	.....
Fiji.....	34,866	9,635
Java.....	2,698	42,511
New Hebrides.....	1,160	.....
New Guinea.....	9,941	5,882
Ocean Islands.....	6,208	3,056
Solomon Islands.....	2,081	.....
Alaska.....	606	.....
Hongkong.....	3,570	8,122
Straits Settlements.....	1,550	35,171
United Kingdom.....	15,097	72,374
Marshall Islands.....	403	.....
Gilbert Islands.....	1,275	411
Guam.....	25,477	.....
Canada.....	3,041	.....
South Africa.....	1,438	3,565
Tonga.....	.....	6,716
Peru.....	.....	3,511
Japan.....	.....	425
Mauritius.....	.....	789
Sweden.....	.....	1,204
Total.....	1,699,321	1,355,492

Exports during August amounted to \$76,000,000 more than in July, being valued at \$646,000,000. In August last year the total was \$527,000,000. For the eight months ended with August exports were valued at \$5,275,000,000 against \$4,009,000,000 in 1918.

M. Loucheur, the French Minister of Reconstruction, in view of the alarming diminution in the output, amounting in some cases to as much as 50 per cent., has commissioned M. Deflane, Director of Mines, to make an investigation with the cooperation of the Societe de l'Industrie Minerale. Commissions of Inquiry have already been appointed in the various coal fields.

Coal is being supplied to steamships, including warships of all nations, in transit through the Panama Canal, delivered and trimmed in bunkers, at \$11.50 per ton of 2240 lb. at either Cristobal or Balboa. For ships not in transit through the Canal, \$11.50 per ton at Cristobal and \$13.50 per ton at Balboa. For ships taking less than carload lots from plants or less than 25 tons from lighters, the price is \$13 per ton at Cristobal, \$15 at Balboa.



COAL AND COKE NEWS



Harrisburg, Penn.

Question of abolition or continuation of state ten per cent. differential interesting people. Commissioner Donaldson opposed to differential. Governor Sproul thinks state fund should have a hearing.

Whether the ten per cent. differential in favor of the State Workmen's Insurance Fund, in writing compensation liability insurance, will be abolished on Jan. 1, 1920, or whether it will be continued until some future date, is a question which is interesting the insurance people. Insurance Commissioner Donaldson, who holds, in his letter to the State Board in charge of the fund, that the matter of abolishing the differential is wholly within his discretion, will be asked to submit the question to the board. Mr. Donaldson is opposed to the differential and believes that all compensation insurance should be on a parity, state fund or not. He has held that view for years.

Governor William C. Sproul, who was not advised as to the Donaldson plan until after the action had been made public, states, "I think that the state fund's side of this matter should be gone into. To my mind the state fund should have a hearing, too." Further than that the governor would not comment.

Mr. Donaldson replied a few days ago to the governor's request that the matter be held in abeyance, with a letter which said that action had already been taken by him under the act of 1919.

Judging from the governor's remarks, the matter will be taken up by the board, whose members in years gone by held that they had advisory powers at least on rates. Whether Mr. Donaldson will insist on the differential abolition or decide to make a trial awhile longer is the interesting question here.

Charleston, W. Va.

Most serious car shortage of calendar year in C. & O. territory. Railroad reverts to old practice. Gives all cars to mines furnishing railroad coal. Vigorous protest lodged. New River field gets 50 to 60 per cent. car supply. Production, 100,000 tons. Impossible to care for contract customers. Mines working half time in Kanawha field.

At no time during the present calendar year has there been a more serious car shortage, at least in mining territory supplied by the Chesapeake & Ohio Ry., than during the week ended Sept. 20, when production was not only seriously restricted but operations absolutely paralyzed for several days. Indeed during the latter part of the week the supply was under 40 per cent. in some parts of C. & O. territory. In other words, there was a 60 per cent. loss from a shortage of cars alone, the result of which was, of course, to force a total suspension of operations at many points. While the shortage in other parts of the state was not so serious, yet it made itself felt even in other districts.

To make matters worse the C. & O. had reverted to the old practice of giving what cars were available to mines furnishing it with railroad fuel, so that while some mines received a 100 per cent. supply, other mines received no cars at all. This of course created widespread discontent among operators, culminating in a vigorous protest lodged with the director general of railroads as well as with the general superintendent of the C. & O.; the only information elicited being that the company was unable to purchase coal and, therefore, had either to confiscate fuel, or else to favor the mines from which it obtained its supply of coal.

The very pronounced shortage made it absolutely impossible for mines to even meet contract requirements, either as to smokeless fuel or as to gas, splint and byproduct

coals. Producers seek to make it plain that were the railroads furnishing an adequate car supply, they would have little difficulty in securing sufficient fuel; as "then it would be possible for producers not only to take care of contracts but to let railroads have a larger supply of fuel; the railroads, however, are averse to buying coal unless they can secure it at ridiculously low prices. Prevailing high prices exist on paper only, as far as West Virginia producers are concerned, simply because they are having the time of their life even supplying fuel at contract prices fixed early in the year.

While export shipments by way of tide-water were somewhat larger during the week ended Sept. 20, there was not a sufficiently large production to enable operators to forward much tonnage either of smokeless, gas or splint to tide. Labor troubles to some extent also checked production.

As showing just how inadequate the supply of cars in the New River region was during the third week of September, it is only necessary to state that on Sept. 20 there were no less than 47 mines in the New River field without a single car available for loading. Taking the district as a whole, actual figures disclose the fact that the mines had only a 40 per cent. supply on the twentieth. The shortage was prevalent throughout the week and, while not so acute earlier in the period, yet was so serious as to seriously handicap producers in getting out coal; the supply throughout the week not averaging more than 50 or 60 per cent. No assurances were given of any improvement with respect to loading facilities, the situation apparently going from bad to worse. Production for the week is estimated at being less than 100,000 tons, an extremely serious situation for a district producing smokeless coal, a large part of which is being exported.

In the New River, as in other fields, operators were finding it absolutely impossible to take care of contract customers. Labor conditions still interfered with production to some extent but not so much so as in previous weeks. There was still no production at mines opposing the "closed shop," which forms a part of the wage contract now in force, and union miners were seeking work elsewhere, but other producers were not inclined to employ men in such cases. Strikes at mines producing what is known as "low coal" had all been settled with one exception. Insofar as it was possible to learn, the volume of New River coal exported was somewhat larger than during previous weeks when vessels were scarce.

An absence of cars at many operations completely disorganized operations in the Kanawha field throughout the week ended Sept. 20, conditions going from bad to worse as the week progressed, so that production was at quite low ebb; mines on an average were not able to work more than half time during the week. The car supply ranged from 70 per cent., at the outset of the weekly period, to 50 per cent. when the week's work was ended. Consequently little more than about 100,000 tons of coal were produced—not enough to enable producers to meet their contract obligations, much less to meet the growing demand for coal. As Kanawha producers are not even able to meet contracts, prevailing high prices do not represent prices being received for coal now being delivered.

Huntington, W. Va.

Logan field suffers loss in output in second week in September due to scarcity of cars. Production 55 per cent. Little prospect of improvement for third week of September. Labor trouble not anticipated.

An increase in the loss of working time, amounting to more than six hundred hours, cost the Logan district, during the week ending Sept. 13, almost 50,000 tons, such a

loss being attributable to a falling car supply. In other words out of a total of 2457 hours lost in the Logan district, 2162 hours were lost because of the scarcity of cars; the total tonnage loss from a car shortage amounting to 140,000 tons as against 91,000 tons for the previous week. The percentage of loss from the meagre car supply rose from 23 to almost 40 per cent., while the total loss in production was increased from 34 to almost 45 per cent., or from 114,000 to 160,000 tons.

With the shortage of cars so pronounced of course production was cut down, slumping from 219,000 to 199,000 tons, a loss of about 20,000 tons; production for the week thus being restricted to about 55 per cent of full time capacity. As less than a thousand tons were lost because of a shortage of miners and only 10,000 tons because of mine disability, it will be evident that the car shortage was the principal factor in so greatly reducing the output in the Logan field. There was little promise of any improvement with respect to the car supply of the Guyan field during the third week of September, the Chesapeake & Ohio still being unable to secure enough cars from connections to keep all mines supplied. Both during the week ended Sept. 13 and during the week ended Sept. 20, not only were mines limited to part time operation but there were many instances where it was necessary to suspend operations pending the arrival of empties. Market conditions had no part in holding back production, there being an ample demand for all coal the mines of the Guyan field were able to produce.

On the eve of an investigation of conditions existing in the Logan field, growing out of charges made by the United Mine Workers, there was little evidence on the surface of any labor trouble in the district and miners in the field were working regularly insofar as the limited car supply would permit and were apparently satisfied as to wages and general living conditions.

Total loadings on the C. & O. for the month of August, as made public by that company at its Huntington offices, amounted to 39,000 cars or slightly less than 2,000,000 tons for the month; the decrease as compared with previous months being attributable to the railroad shopmen's strike early in August.

Fairmont, W. Va.

Third week in September one of the best production periods of the year. Heavy shipments eastward. Increase in tonnage west. Cars scarce on Western Maryland and Coal and Coke railroads. Effect of steel strike on output of coal and coke.

The week ended Sept. 20 stood out in bas relief as one of the best production periods of the year in the Fairmont region; the output being eclipsed in only one other weekly period during 1919—the week ended Aug. 23. The tonnage loaded on the Monongah division of the Baltimore & Ohio amounted to 325,000 while for the region as a whole the production was only a few hundred tons short of 400,000 tons; 7984 cars of coal being loaded and shipped in the region. The mines succeeded in overshadowing production for the corresponding period of 1918.

All previous records for the month of September were eclipsed in the shipment of coal eastward, amounting in all to 5629 cars. Western shipments, amounting in all to 920 cars of coal, were the heaviest of the year. At the same time there was a perceptible increase in western shipments of coke. Tidewater shipments grew in volume insofar as Curtis Bay was concerned, there being 1120 cars of coal shipped to that point; the heaviest tonnage for the year with the exception of the week ended Aug. 23. On the other hand, there was a marked decline in the tonnage flowing to St. George's piers.

There appeared to be a stronger market for northern West Virginia coal at the Lakes, shipments to such points showing an increase over previous weeks. Embargoes were still checking tidewater shipments to some extent.

In sharp contrast to conditions in the Fairmont region were those in other northern West Virginia fields, where mines were experiencing much trouble in securing cars. Empty cars were a negligible quantity on the Western Maryland R.R.; mines along that road were marking time and producing little coal. Coal loading equipment was also exceedingly scarce on the Coal and Coke division of the B. & O. R.R. At one point in the northern West Virginia fields on the twentieth no cars were to be had. Coal is being confiscated in some instances by one of the roads operating in the northern part of the state.

Speculation is rife as to what effect the steel strike will have on the production as well as on the price of coal produced in northern West Virginia fields. While prices have been slightly affected, changes have been almost imperceptible. So far as can be learned the volume of coal being shipped to steel plants is not exceptionally large. Coke production will be affected to a greater extent than coal, should the steel strike be protracted.

Bluefield, W. Va.

Pocahontas field increases output in second week in September. Car supply better. Export and contract trade in fair shape. Production slightly increased in Williamson field.

Marked improvement in the car supply in the Pocahontas region enabled mines in that region to materially increase their output during the week ended Sept. 13, the increase amounting to 56,000 tons, restoring the output to the figure reached in July and upon one or two occasions since then. In short from 282,000 tons for the week ended Sept. 6, production was advanced to 338,000 tons. This was accomplished by virtue of the fact that the loss from a shortage of cars was reduced from 153,000 to 116,000 tons, or a decrease in the loss of 42,000 tons.

During the previous week the shortage had become so serious that many mines had to suspend operations, operators entering vigorous complaints, which apparently had some effect judging from the improvement in the car supply. With more cars available it was possible for Pocahontas producers to take care of export shipments as well as to make delivery of coal on contracts and to overcome to a slight extent the growing shortage of smokeless coal.

During the second week of September several large export shipments were started overseas and much coal for bunkering was shipped to tidewater. Shipments of Pocahontas coal to western points was comparatively limited although in greater volume than during the previous week. While the production of coke was not quite as heavy as during the previous week, production as a whole was maintained, there having been 12,819 tons of coal coked, some of it for inland western markets at a substantial price.

While figures covering production in the Williamson field are not available, production was increased slightly in that region owing to an improvement in the car supply, which has been for several weeks affecting production to the extent of about 25 per cent.

PENNSYLVANIA

Anthracite

Mt. Carmel—Recently a miner died as the result of injuries received from a fall of rock at Sayre colliery near here. This was the first fatality for a Lehigh Coal Co. mine in the entire district for the present year, which is a remarkably good showing.

Hazleton—The contract expired recently, which is said to have been made ten years ago by the contractor who has been doing the stripping for the G. B. Markle Co., at Ebervale and Oakdale, in the Black Creek basin north of this place. To strip the valuable Mammoth seam here, a score or more of steam shovels and other equipment in proportion was used; the contractor has just turned this property over to the Markle company. Other sections of this basin will be stripped and a large ditch dug to keep the waters of the valley out of the strippings and the mines here. An article descriptive of this mammoth stripping appearing in the Sept. 25, 1915, issue *Coal Age*, under the title of "Large Stripping Operation."

Harrisburg—Under the provision of a new act of assembly, approved recently, it is unlawful for any person to change his name or assume a different name unless such change is made pursuant to proceedings in court and approved by the court. It is believed that the act is aimed mainly at a certain class of foreign-speaking men employed about the mines, who go from colliery to colliery using a new name in each place of employment, evading payment of debts and taxes and also evading punishment or discipline for violations of the mine laws. Such men have been known to be discharged at one mine for smoking in safety lamp districts, and a few days later were found working in another section of the same mine under a new name.

Shenandoah—A suit to force the sale of 973 acres of coal land in Locust Mountain was filed in court recently, and an injunction applied for. The Girard Mammoth Coal Co., a concern mining coal in a tract acquired by Stephen Girard, figures prominently in the proceedings. Defendants include J. Crosby Brown, Philadelphia, the Wentz Corporation, New York, the Home Missionary Society, of Philadelphia, Pennsylvania Company for Insurance of Lives and Annuities, W. H. Ingram, Thomas De Witt Cuyler and Charles Tate, New York. Girard Mammoth Co. asks that the Raven Run Coal Co. be restrained from declaring void their lease, on which the Raven Run Co. is now operating. The present suit is the culmination of a series of disputes between the lessees and those controlling the coal lands involved.

Bituminous

Washington—The directors of the Houston Coal Co. have leased their Arnold mine to the Pittsburgh Mining Co., which is composed of Brownsville capitalists. The Houston Coal Co. is still operating its Pacton and McBurney mines.

Somerset—The Bittner and Walker mines, at North Somerset, Penn., have been sold to the Cosgrove Coal Co., of Johnstown, Penn., the consideration being private. The property includes 300 acres of coal and mining plant. James A. Meehan will superintend operations.

Iselin—The Brown Coal Co. has completed its Gallon steel hoist and tippie, at Clarksburg (Indiana County), near here, and will begin loading the coal this week. The Brown company purchased the old "Hart" operation, which was the first mine opened in the Pittsburgh seam here for custom coal many years ago.

Mount Savage—It is reported that C. J. Rowe & Bros., Meyersdale, Penn., have purchased the entire equipment and leased the 2,000 acres of the old Bond and Parker mines at Barreilville, near here in Allegheny County, Md. Until recently these mines were operated by the Georges Creek Parker Coal Co. The lessees will install a conveyor belt system. The same company recently purchased the entire stock of the Big Vein Coal Co., of Mount Savage, and are mining coal under that name.

Blairsville—F. G. Davis has reopened two of his mines in the Pittsburgh seam here (Indiana County), and has a production of about 100 tons per day. He has announced that he will reopen the old mine on the Campbell farm, just north of Blairsville, in the near future.

Another historic land-mark of Indiana County passed out of existence when the old Smith mine, just north of here, was abandoned a few days ago. It was operated by the Robert Smith Coal Co., at Smith Station, on the Indiana branch of the Pennsylvania railroad. It was one of the oldest operating mines in Pennsylvania, being opened in 1823, thus making it 96 years old. It had been in continuous operation since its opening. It was the first mine in Indiana County to make shipments by rail, and has always been used to coal the engines of the Indiana branch trains. The tippie and other buildings are being dismantled and moved away.

WEST VIRGINIA

Charleston—According to announcement just made, equipment for five of the mine rescue stations recently established has been received and installed, the five stations being at Elkins, Wheeling, Fairmont, Mt. Hope and Charleston. While no permanent headquarters have been found yet for the rescue stations at Wheeling and Charleston, it is expected that it will be possible to find suitable headquarters in the

near future. The training of crews at the various stations will be started at once. Should the occasion arise, any of the five stations are prepared to answer an emergency call.

While wagon mine operators have not been able so far to get into the market, owing to the fact that railroad companies will not furnish them cars, nevertheless the prediction is made that such mines will become potent factors in supplying many markets with coal during the coming winter, when there is apt to be a most pronounced shortage of domestic coal. This shortage is expected to bring about a return of the activities seen two years ago when wagon mines in West Virginia furnished about a million tons of coal in the space of a year. Under present market conditions wagon mines can be profitably operated, but for the last month there has been an order standing both as to the Baltimore & Ohio and the Monongahela railroads, in northern West Virginia, not to supply wagon mines with open top cars owing to the general shortage of cars; only a few days ago the Morgantown & Kingwood also promulgated a similar order.

OHIO

Martins Ferry—The Jones Coal Co.'s mine has resumed operations after being almost entirely idle for a period of a year. The company has erected a loading platform at the Pennsylvania siding here. Last year it loaded on the Wheeling & Lake Erie.

St. Clairsville—The Pursglove-Maher Coal Co. has purchased a large tract of land in the southeastern part of the town, on which they will build 100 houses. These will house employees who work at the company's mines in this vicinity. The addition to the town will be independent of the large number of miners' homes owned at the mines. Special train service and low commutation fares are obtained by the company to its mines for the employees residing here.

Pomeroy—The Vulcan Coal Co., of Pittsburgh, has sold its mine at this place, Meigs County, Ohio, to Jefferson and Belmont county men for \$200,000. The company will operate the mine which has 2,000 tons daily capacity and 800 acres of unmined coal.

In buying the coal, the company also secured a large amount of surface which will be used for town purposes, present plans calling for the erection of 50 houses in the immediate future, with the possibility of more going up within the next year.

Windsor—The Beach Bottom mine of the Richland Coal Co. was sold recently to West Penn. interests of the American Gas and Electric Co. This property is in Ashtabula County in the extreme northeastern part of Ohio. The deal is said to include the transfer of over 4000 acres of valuable coal land. No intimation of the purchase price would be made by the officials. This in no manner affects other interests of the Richland company, it is said. It developed that the purchase was made to supply coal for the big Windsor plant. Although the present production of the mine is stated to be about 400,000 tons annually, it is expected that the new owners will increase production by at least 50 per cent. The tippie is close to the power plant.

Cincinnati—The Ohio is to do its part in filling the bins with coal, on which depends the business and comfort of other river towns and cities, says a dispatch. Orders issued by Colonel Lansing B. Beach, U. S. division engineer in charge, directed the starting of the first "navigation wave" of the present season. The wave was to begin at Dam No. 14. In anticipation of it, coal fleets assembled at the loading places adjacent to the mines on the Ohio and Kanawha rivers. Millions of bushels of coal were on the barges ready for the start. Should circumstances make it necessary, the "waves" will be operated about every two weeks. If the shippers are able to make use of them that frequently.

INDIANA

Hammond—The second battery of 60 coke ovens of the Mark Manufacturing Co., Indiana Harbor, has begun production with a capacity of 1200 tons of coal daily. This makes a total of 120 ovens in operation, and two additional batteries of 60 ovens each are planned.

Terre Haute—The engine room and boiler house at the Wizard mine of the

Hall-Zimmerman Coal Co., near West Terre Haute, in Sugar Creek Township, was destroyed by fire. Not much damage was done to the tipples, as the fire department of this place rendered valuable assistance. About 200 miners were at work in the mine when the fire broke out, but they made their escape through an opening to the Deep Vein Coal Co.'s workings adjoining.

ILLINOIS

Springfield—The first-aid team from Gillespie won the state championship cup in the mine-rescue contest at the arsenal here. Second place was won by the team from the Harrisburg rescue station. The team from mine No. 8 of the Madison Coal Corporation, Carverville, made the third highest average. The three teams will represent Illinois in the national first-aid contest to be held in Pittsburgh, Sept. 23 and 29 and Oct. 1. Twenty teams took part in the competition. The contest was conducted under the auspices of the United Mine Workers, various operators' associations and the state Department of Mines and Minerals, assisted by the Federal Bureau of Mines.

Benton—The directors of the Modern Coal Co. recently completed the organization of the Southern Gem Coal Co., which has taken over the mine of the Modern Coal Co. at Sesser, the West Frankfort Coal Co. mine at West Frankfort, and the Crown Coal Co. mine at Winkle, together with a large acreage of coal land in Franklin, Perry and Jefferson counties. The following officers were elected: Jesse Dimond, of Chicago and Benton, president; Thomas Horn, St. Louis, vice president; Herman Rea, of St. Louis and Christopher, secretary; John Dillavou, of Champaign, treasurer. It is the intention of the new company to mine coal on an extensive scale and to develop their holdings rapidly. The company plans to sink a new mine in Goode Township in the northwest corner of Franklin County; to make improvements at the West Frankfort and Winkle mines, and work will probably be commenced at an early date on the sinking of a mine near Waltonville in Jefferson County. The company has already secured options on Jefferson County coal land, in connection with that already owned.

The big Middlefork mine of the United States Fuel Co., in Franklin County, is becoming one of the largest plants of its kind in the state; its washer is said to be one of the largest in the country. The United States Fuel Co., of the United States Steel Corporation, is now erecting a large coke-oven plant near the Middlefork mine; when completed the plant will cover nearly 25 acres of ground. The company has recently purchased 30,000 acres of land adjacent to the mine and three miles east of here. A new town, known as Steel City, has been laid out and lots are being sold rapidly. The Middlefork mine now employs between 900 to 1200 men and, with the coking industry being launched, many more will be taken on later.

The Franklin County Coal and Mining Co. has completed a modern mine immediately north of the Steel City town-site and this mine is now being operated steadily. It is probable that within 18 months, the town will have a population of several thousand. The United States Steel Corporation has spent millions of dollars buying thousands of acres of coal lands in this section.

KENTUCKY

Louisville—Representatives of the coal mining interests of Harlan County, Kentucky, recently discussed the car shortage and other problems of the operators in this field with a number of senators from Kentucky and other southern states. The operators are seeking concerted action looking to improved transportation for the product of their mines to market.

Elkhorn City—G. A. Corson, president of the Corson Byproduct Coal Corporation, of this place, has sold his holdings in this company. Mr. Corson is understood to have owned 54 per cent. of the stock of this concern. The purchaser was F. J. Mitchell, of Hellier, Ky., one of the pioneers of the Elkhorn field. The deal is said to have involved upward of \$100,000. It is expected that R. W. Shumway, a mining engineer of Pikeville, Ky., will take charge of operations, as general manager.

London—A strong revival of industrial activity in Laurel County is quite noticeable. Coal mining plants at Viva, East Bernstadt, Lilly, Pittsburg and other places in the county, which have been shut down for several months this year are now in

operation. Many of the miners who left this county last year for the coal fields of Harlan, Perry and Deil counties are returning. The opening of new coal fields in Laurel County, as soon as contemplated railroad extensions can be made, is being discussed here. Laurel County coal has been mined for the last 40 years this being the oldest mining county in southeastern Kentucky.

Lumber mills in all parts of the county are running at capacity to supply local and foreign demands, and the surplus of labor, which a few months ago seemed imminent, is now more than taken up by the mines, mills and various road construction projects. The Louisville & Nashville R.R. is spending more than \$1,000,000 in constructing yard extensions in Corbin.

Personals

James R. Riggs, who has been appointed assistant secretary of agriculture of the United States, has been prominently identified with the coal development of Sullivan County, Indiana.

R. Z. Virgin, formerly in charge of mine extension work in various sections of West Virginia, has become associated with the Carnegie Institute of Technology, Pittsburgh, Penn. He is to be connected with the co-operative department of mining engineering at the institution.

George P. Brennan has resigned from his position in the engineering department of the Hillman Coal and Coke Co., at Brownsville, Penn. He has returned to his home at Scottdale, Penn., to take charge of the estate of his father, the late J. P. Brennan, who had large coal and coke interests in Fayette County, Penn.

James R. McNeill, who recently resigned his position as manager of No. 11 colliery of the Dominion Coal Co., has assumed charge of the Florence mine, of the Nova Scotia Steel and Coal Co. This appointment follows closely upon the engagement of M. A. S. McNeill as superintendent of mines of the Scotia company and D. H. McLean as manager of this company's Princess mines. Both of the latter also severed their connection with the Dominion company to go with the Scotia corporation.

Howard Cross, president of the company which recently acquired the plant of the Knob Coal Co., in Monongalia County, W. Va., is also interested in a number of other coal operations, as follows: He is general manager of the Carroll Cross Coal Co., of Emoryville, W. Va.; vice president of the Elk Garden Big Vein Coal Co.; general manager of the Emory Run Coal Co., of Mineral County, W. Va.; general manager of the Hartman Run Coal Co., near Morgantown, W. Va., and president of the Ino Coal Co., of Morgantown.

James Russel Fleming has been appointed Research Associate in Mining Engineering of the University of Illinois in the Engineering Experiment Station. Since he was graduated from the University of Pittsburgh in 1911, with the degree of Engineer of Mines, he has had the following experience in connection with mining: Assistant mining engineer with the United States Bureau of Mines 1912-17; since Dec., 1918, he has been engaged in part-time work for the United States Bureau of Mines and in practical engineering work.

Carl Scholz has been elected vice president and general manager of the Raleigh-Wyoming Coal Co., a West Virginia corporation, with headquarters in Charleston, W. Va.

This company will immediately commence the development of two mines. One will mine the Beckley seam, on the head waters of the Guyandotte River; this operation will be a shaft mine about 700 ft. deep. The other mine will be in the Eagle seam, on the head waters of the Coal River. Both operations will be equipped with modern machinery and are expected to become large producers.

Henry Bonnell, aged 54 years, a business man and owner of large coal interests, died recently at Cambridge Springs, Penn.

Industrial News

Marrowbone, Ky.—The Marrowbone Mining Co. is planning development of a large acreage located on Marrowbone Creek and paralleling the present property.

Cleveland, O.—Harvey L. Wells, of this place, is understood to have completed negotiations for the purchase of extensive coal properties in the vicinity of Morgantown, W. Va. Plans for development at an early date are now in process of formation.

South Milwaukee, Wis.—The Bucyrus Co., of this place, announces the opening of an office in the American Trust Bldg., Cleveland, Ohio, in charge of E. G. Lewis, district sales manager.

Thornton, Ky.—A. C. Craft, Thornton, has recently completed negotiations for the leasing of coal properties in the Thornton Creek district, and it is understood that plans are now in process of formation for immediate development work.

New York, N. Y.—F. H. Niles & Co., Inc., announce the following appointments: G. P. Goodman, formerly with the Hisey-Wolf Machine Co., takes charge of the company's portable tool department. Other changes in the Niles company are the appointment of F. H. Crawford, as secretary, and J. E. Haetten, as sales manager.

Bluefield, W. Va.—Announcement has been made by the Black Eagle Coal Co. that its offices are to be moved from Richmond, Va. to Graham, Va. The company recently changed hands, Tazewell County business men acquiring a controlling interest in it. The company's mines are located in Harding County, Ky., where a large output is produced.

Huntington, W. Va.—The Hyatt Roller Bearing Co., of New York, has established a branch office at this place. H. G. Nash, of the Huntington district, will be in charge of this office. The haulage problems of the mines in this district will receive the special attention of Mr. Nash and his assistants.

Valparaiso, Ind.—The Chicago Mica Co., of this place, has recently acquired the services of L. T. Frederick as consulting engineer and production manager. Mr. Frederick was formerly process engineer of the Westinghouse Electric & Manufacturing Co., of Pittsburgh, Penn. He has had a broad experience in the manufacture and application of all lines of electrical insulation.

Aurora, Ill.—The Barber-Greene Co., of this place, recently began work on the construction of a 90 x 180-ft. addition to its plant. This is the second time this year that additions have proved necessary to handle the work of this concern. The new building will be used as the assembly department and will be modern throughout. It is hoped to have this work finished within 60 to 90 days.

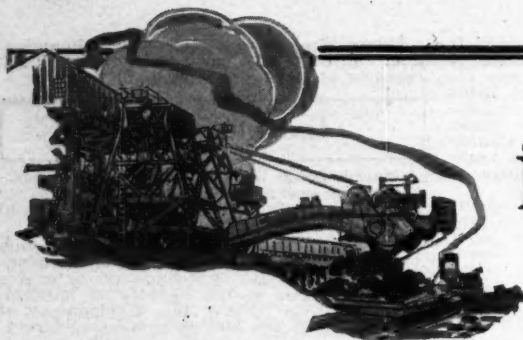
Huntington, W. Va.—The Ohio Valley Mine Car Co., manufacturer of mine cars and auxiliary equipment, has awarded a contract to the Huntington Iron Works, Huntington, for the erection of two new additions to its plant, for increased capacity. The structures will be of brick and steel construction, about 90 x 150 and 40 x 140 feet, respectively. E. E. Brown is manager.

Chicago, Ill.—Announcement is made by the Williamsport Wire Rope Co., Williamsport, Penn., of the establishment of a branch office and warehouse at this place under the direction of C. M. Ballard, formerly connected with the Williamsport organization at Cleveland, Ohio. The Chicago office is located at 122 South Michigan Ave., and the warehouse at 755 West Quincy St. This new Chicago branch is the latest step in the development of the Williamsport's distribution organization. The concern now can guarantee immediate shipment from Chicago to customers in the territory served from that point.

Himler, W. Va.—The Himler Coal Co. is arranging for the installation of the necessary mining machinery, equipment, etc., for the development of about 1400 acres of coal properties located in the vicinity of Warfield, Ky., to have an ultimate capacity of about 2000 tons per day. Work was recently started on the construction of a new railroad bridge across Tug River and a 1½-mile siding to have a capacity of 2500 tons of coal, estimated to cost about \$130,000. The development plans of the company include the erection of about 40 miners' houses. Martin Himler is president and manager; and E. Melring, Kermit, W. Va., is construction engineer.

Obituary

George Herbert Smith, export manager of the Berwind-White Coal Mining Co., No. 1 Broadway, New York, died on Sept. 10 at the Post-Graduate Hospital. Mr. Smith was in his fifty-second year.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



WEEKLY REVIEW

Coal market listless. Steam sizes of bituminous moving slowly. Domestic demand in Middle West is good. Prices being maintained. Anthracite steam demand slow, domestic sizes in short supply.

The coal market is devoid of any particular interest. Inquiry for the steam sizes is only scattering and confined to small tonnages. The strike in the iron and steel industry has greatly curtailed the consumption of steam, gas and by-product coal, particularly in the Ohio district. In the Middle West the demand for domestic coal is keen and operators are behind in their orders. Prices as a rule are firm, though recessions have been noted.

The main topic of conversation in coal circles this week is the steel strike. Next to this come the demands framed by the mine workers at their recent convention in Cleveland, which embrace a 60 per cent. increase in wages and a six-hour day for five days a week. Operators will express no opinion as to the outcome of the mine workers' requests until the matter has been thrashed out by the representatives of both sides at meetings now being held in Buffalo.

Demand for the steam anthracite coals is somewhat improved over last week. Domestic sizes of hard coal, like egg and stove, are still being eagerly sought and, as in the past, the supply is unequal to the demand.

WEEKLY COAL PRODUCTION

A continued increase in the output of bituminous coal during the week ended September 13 carried production to the highest point attained this year. The total output, including lignite and coal made into coke, is estimated at 11,080,000 net tons as compared with 9,633,000 tons during the preceding week, an increase of 15 per cent. It is even 418,000 tons, or 4 per cent., higher than the production during the week of Aug. 23, which set a new mark for the year.

The drop in output during the week of Labor Day now proves to be due to observance of the holiday and not to a decline in the rate of production during the working days remaining. For the first time since January, the curve of 1919 performance has overtaken the line of 1917.

The output of anthracite during the week ended Sept. 13 is estimated at 1,564,000 net tons. This was only 64,000 tons more than the production during the preceding week, which was interrupted by the Labor Day holiday. It was 19 per cent. less than during the last week of August, which set the record for this year.

It is necessary to bear in mind that the week ended Sept. 6 included Labor Day. In districts where the labor unions are strong, the day was generally observed as a holiday. In others it was observed but little if at all. In some of the districts it was observed at certain mines and not at others. Over the country as a whole roughly one-third of the capacity worked as usual. The closing down of the other two-thirds naturally cut into the total output for the week but performance during the remaining working days was better than usual. The percentage of full-time capacity realized in actual output was 70.3, the highest mark attained since last January.

Time taken by the miners for holidays and demonstrations in excess of Labor Day was effective in curtailing output in central Pennsylvania, New River and Winding Gulf, western Kentucky, and especially in the Southwest. In Kansas and Missouri, for example, losses attributed to extra holidays amounted to 11.6 per cent. of full-time capacity. These losses were largely compensated for by the gradual improvement of the labor situation in Illinois, which attended the cessation of recent strikes.

Reports of a sluggish market are still occasionally received, especially from Ohio, Alabama, the Hazard field and the Rocky

Mountain region. In the country at large losses due to no market amounted to only 2.1 per cent. of full-time capacity.

The closing of many mines on Labor Day assisted the railroads in catching up with the demand for empties. In consequence, fewer complaints of car shortage were received. With three exceptions—Westmoreland, central and western Pennsylvania—all districts reported an improvement in car supply. Even with a five-day week, however, many mines could not get all the cars needed. Taking the country as a whole, their losses of output amounted to 18.9 per cent. of full-time capacity, nearly twice as much as all other causes of loss combined. A 100-per cent. car supply would have increased the week's production by some hundreds of thousands of tons.

The production of beehive coke during the week of Sept. 13 (441,312 net tons) fell slightly short of the high mark established the week before. The decrease was 6400 tons, or 1.4 per cent. With the exception of the preceding week, however, the output was higher than had been attained in any week since Feb. 22. The cumulative production since the beginning of the year stands now at some 8,000,000 tons less than during the corresponding months of 1918. The decrease appears to be due not to a deficit in the supply but to a decrease in demand and to the increasing substitution of byproduct for beehive coke.

The tonnage of bituminous coal dumped at lower lake ports during the week ended Sept. 7 was 27 per cent. less than that of the preceding week and less than half the amount reported for the corresponding week of 1918. The total tonnage dumped from the beginning of the season to date is 16,702,012, a million and a quarter tons, or 7 per cent., less than during the same period last year. The decrease in comparison with 1918 is explained in part by the general decline in consumption which followed the armistice, in part by the large stocks accumulated last year by consumers at the head of the lakes and carried over into the season of 1919.

Atlantic Seaboard

NEW YORK

Anthracite situation steadier and demand slackens. Local dealers satisfied with year's business and do not look for any trouble this winter. Oil making inroads on the steam sizes and steps may be taken to educate public to the use of buckwheat. Bituminous situation not yet affected by the steel strike. Shipments not increased. Demand is easy but prices remain firm.

Anthracite—The situation is becoming steadier. Demand is not so urgent and the market is settling down to a firm basis. Movement of coal here has been on a good basis and the local retail trade is not in a position where a temporary relaxation in receipts would be seriously felt. While some of the dealers have unfilled orders, these are mostly for egg and stove, which at the moment are in no better position as regards supplies than for the past several weeks. Chestnut, which has been the easiest of the three larger sizes, is now being rapidly absorbed.

The trade here is devoting much of its time to considering ways and means for keeping down the surplus of the steam sizes, particularly buckwheat. The inroads being threatened on the trade by the oil interests are becoming more serious and the producers are realizing that something must be done. Some of the trade believe that the remedy lies in educating the public to the use of buckwheat for heating homes and that all that would be necessary will be the installation of furnaces equipped for burning this size coal.

Rice and barley are in small demand with stocks piling up, many of the producers having already stored large quantities of these sizes.

Bituminous—The local market has not yet felt the effects of the steel strike, unless it can be said that less coal is being sent here because of the many individual mine strikes due to sympathy for the steel workers. These were numerous the first few days of the trouble among the steel workers and as a result less coal was forwarded to tidewater. But this cut in shipments did not seriously hamper conditions here. Demand was not heavy and the trade was amply provided for.

A feature of the local conditions is the steadiness of the quotations for the various grades which, with the exception of a few instances, remain on practically the same basis as last week. Shippers here have not yet had occasion to lower prices in order to move their supplies and are not likely to do so unless the producers find it necessary to divert considerable of the tonnage usually taken by the steel companies to tidewater.

At this writing there is no big supply of gas or coking coals here.

The demand for coals for export is heavy and appears to be increasing. The only hindrance to a much larger trade is the lack of bottoms. Shipments from the southern ports are being held up because of the commandeering of considerable tonnages by the Navy Department. This order takes away from the trade the high grades suitable for the Navy vessels and it will be Dec. 1, some shippers believe, before shipments of these grades can be resumed to foreign countries.

With producers holding back excessive shipments to this market unless there is an order for their coals, there is little likelihood of an overcrowded situation developing here followed by a break in prices.

There is considerable coal in the various pools and quotations for coal, f.o.b. at the pier range about as follows: Pools No. 1, 9 and 71, \$5.55@5.90; No. 10, \$5.15@5.35; No. 11, \$4.90@5.10; and Nos. 18 and 41, \$4.80@4.90.

Quotations for spot coals, net tons, at the mine range about as follows:

	Spot
South Fork (best).....	\$3.25@3.50
Cambria (best).....	3.00@ 3.25
Cambria (ordinary).....	2.60@ 2.90
Clearfield (best).....	3.00@ 3.25
Clearfield (ordinary).....	2.60@ 2.90
Reynoldsville.....	2.85@ 2.90
Quemahoning.....	3.25@ 3.50
Somerset (medium).....	3.00@ 3.25
Somerset (poor).....	2.50@ 2.75
Western Maryland.....	2.50@ 2.75
Fairmont.....	2.50@ 2.65
Fairmont 1 in.....	3.10@ 3.25
Latrobe.....	2.60@ 2.90
Greensburg.....	2.75@ 3.00
Westmoreland, 1 in.....	3.50@ 3.75
Westmoreland run-of-mine.....	3.20@ 3.35

PHILADELPHIA

Anthracite retail demand unabated. Orders pile up. Pea plentiful and moving fairly well. No increased mines prices likely for October. Steam situation better, but all sizes plentiful. Bituminous arrives in good volume. Contract deliveries heavy.

Anthracite—Without question the retail demand for coal keeps up. With the exception of pea coal the dealers have had no stock of coal on hand whatever. The few who did manage to accumulate a little chestnut are working into their piles and the market will soon be bare of this size. The call for nut is equally as strong as that for stove now. And the need for egg also remains unfilled. Many dealers have been carrying orders for this size all summer and still unable to make delivery. In numerous instances customers tired of waiting gladly took some other size. The only size that can be had without difficulty is pea, as all dealers maintain large stocks of this size.

Ever since the individual shippers jumped prices with so little notice most dealers have been somewhat wary about accepting business at a fixed price. Even those dealing exclusively in company coal have

been using a certain amount of caution, as rumors have been frequent that even the companies might increase their schedule. However, for October it is certain that the company shippers will continue at the winter circular which became effective Sept. 1. With the individuals it is not quite certain, although it is generally felt that not even they will attempt to add anything to the price this month. The steam coals are showing some slight improvement. Buckwheat is going well, but with still plenty to be had, especially from the larger companies. Probably less of this coal can be bought off price from the individual shippers now, and this in itself would appear to be a sign indicating a better situation. Rice and barley are only in fair call, but even they are inclined to display improvement with some shippers.

Bituminous—One thing about bituminous at the present time is that any one wanting a car of it has very little difficulty in having his needs met. The tide embargoes have been mainly responsible for this situation and some shippers have had difficulty in working off accumulated tonnage. Contract customers are getting heavy shipments, and as long as they are willing to accumulate stocks the market can be said to be in good shape. The prices per net ton at this time are about as follows:

Georges Creek Big Vein.....	\$3.10@3.25
South Fork Miller Vein.....	3.10@3.25
Clearfield (ordinary).....	2.75@2.90
Somerset (ordinary).....	2.70@2.85
Fairmont lump.....	3.20@3.30
Fairmont mine-run.....	3.00@3.10
Fairmont slack.....	2.50@2.60
Fairmont lump (ordinary).....	2.95@3.00
Fairmont mine-run (ordinary).....	2.70@2.80
Fairmont slack (ordinary).....	2.50@2.65

BALTIMORE

With liberal supply of coal at tide and hundred per cent. run of empties in some coal regions the price list has begun to tumble in these steel-strike days. Exports continue to grow and another pier is ordered open. Anthracite rates to be advanced.

Bituminous—Owing to the steel strike many cars have been released from service in that industry, and quite a few of the coal-mining regions are now running a 100 per cent. supply of empties. The Locust Point pier of the B. & O. has been opened to relieve the congestion at tide, where particular grades of coal were jammed in every direction, while others badly needed here could not come in because of strict embargoes. This reopening for harbor and bunker business, along with some fast work in export loading at the other piers, cleared out some of the congestion, and coal of high-grade steam varieties which had been scarce began to pour in under permit. All shipments are controlled under the embargoes by permits and this is making for a more even handling. With all classes of soft coal now in liberal supply and with strike conditions cutting down call on line points, fuel is offering here at mine-basis prices to the trade considerably below recent levels.

The best low-volatile coals are now offering to the trade at about \$3.25, although some sales are recorded up to \$3.40. Good-to-specialized coals are selling at from \$3.15@3.29. Fair-to-good coals in many cases are offering at from \$2.60@2.80, while mixed lots are to be had at times as low as \$2.15. Gas coals show the widest fall, for, while some of the specials are holding around \$3.25, there are offerings of Fairmont three-quarter as low as \$2.50. Run-of-mine is bringing about \$2.35 and slack \$2.25.

The export business here is tremendous. For the week ending Sept. 20 a total of 75,369 tons of cargo coal was loaded. This makes a loading for the first three weeks of September on foreign account of 207,725 tons, and as these same coal carriers took out 32,991 tons of bunker coal, the total loading on this export movement was 240,716 tons.

Anthracite—The hard-coal dealers here spent a part of the week at least in discussing the coming price for October. It was taken for granted generally that an advance would be made. In some quarters it was felt that a 25c. advance on all grades might cover the situation enough to satisfy some in the trade, but there is undoubtedly a sentiment in a large part of the trade that an advance of more than 25c. a ton will be necessary. When the exchange meets at the close of the present week it is likely that final action will be taken to settle the October price list. Meanwhile orders are at present comparatively light.

Lake Markets

PITTSBURGH

Iron and steel strike curtails consumption of steam, gas and byproduct coal. Lake movement not affected. Market exhibits occasional soft spots.

Even since the completion at the Cleveland convention of the miners' wage scale demands, the coal operators of the Pittsburgh district have refrained from any public expression of opinion on the subject, and no official or semi-official statement is available.

The strike in the iron and steel industry touches the coal industry in several respects. Thus far it has not interfered with the movement of lake coal, and it is very improbable that it will. While the Seamen's Union, which has membership of a fraction of the men on the lake coal and ore fleet, the rest of the men being unorganized, is one of the 24 unions paraded as sponsors for the "General committee for organizing iron and steel workers," not only have the vessel men not struck but the executive board has not at this writing even decided the question it considers is before it, whether or not it will take a strike vote of the membership. The lake vessels are moving as usual except that on account of nearly all the private ore-receiving docks, attached to blast-furnace plants, being tied up by the strike and the railroad docks having to take dock ore instead of through ore, the boats have long waits for unloading and their round trips are lengthened. The lake coal movement is near its end in any event.

The iron and steel strike has greatly decreased the receipt of coal by steel plants. Practically all the steel plants and rolling mills in the Mahoning valley are down, with fully half the Shenango valley, and the coal consumption by mills in the Pittsburgh district is decreased by approximately one-third. The Allegheny and Kiskiminetas valleys are out one-third or more. Men at mines supplying the Vandergrift plant threatened to strike if the coal supply to the plant were not shut off, but trouble on that score was averted by the Cleveland convention declaring against sympathetic strikes, obviously because it had a big enough contest of its own in prospect.

The movement of coal to byproduct plants is greatly decreased through the closing of the byproduct plants at Youngstown, of the Republic, Youngstown Sheet and Tube and Brier Hill companies, about 500 ovens in all, normally consuming 13,000 or 14,000 tons daily, while the Cleveland plant of American Steel and Wire is also down. The Lorain and Farrell plants are operating and the great Clairton plant is reported operating more than 50 per cent., its full consumption being about 20,000 tons daily. Its coal, however, comes wholly from the Connellsville region.

The market has exhibited occasional weakness in spots and there is a somewhat easier tone all around. Regular prices are approximately as follows: Slack, \$1.80@2; mine-run, \$2.40@2.50; screened gas, \$2.60@2.80, per net ton at mine, Pittsburgh district.

BUFFALO

Everything unsettled. Bituminous prices not strong. Anthracite plenty in lake trade only. Next to none in local trade.

Bituminous—The trade is anything but satisfactory. Buffalo is a steel-strike center and will not try to do much business in that line right away. The furnaces are shutting down, to wait till the men get enough of striking. The chances are that coal will be plenty soon and that prices will not be strong. Sales will be made with much caution. It is already reported that some fancy coals, which have been commanding a premium, are weakening, though that must have been in anticipation of the result of the strike.

Quotations remain at \$4.55 for Allegheny Valley sizes, \$4.80 for Pittsburgh and No. 8 lump, \$4.65 for same three-quarter, \$4.20 for mine-run, \$4.10 for all slack, \$4.60 for smokeless and \$5.70 for Pennsylvania smithing.

Anthracite—The late strikes of miners in two of the leading companies has so cut down shipments that nearly all that comes this way has been turned into the lake trade, so that while that keeps up well the city is pretty nearly bare of coal and the consumers are clamoring for a supply. The miners' strikes are over and the coal begins to come in again, but with industrial conditions what they are the movement is doubtful. Lake vessel owners are looking for a sympathetic strike on the part of their seamen.

Anthracite shipments by lake continue much better than any other branch of the trade, as the coal must be moved this fall if at all. Shipments for the week were 128,391 net tons, of which 82,491 tons cleared for Duluth or Superior, consignee's option; 22,500 tons for Chicago; 10,600 tons for Milwaukee; 7200 tons for Waukegan; 2800 tons for Manitowoc; 2400 tons for Racine and 400 tons for St. Ignace.

CLEVELAND

Receipts of bituminous coal are about normal, while consumption in northern Ohio, due to the steel strike, is off about 45 per cent. Retail dealers are beginning to catch up on their orders for anthracite and Pocahontas. All prices remain firm.

Bituminous—Cleveland and northern Ohio, which includes the Youngstown district, appear to be the storm center of the nation-wide steel strike. The industry in Cleveland and northern Ohio is estimated to consume from 40 to 45 per cent. of the coal brought into the territory, and the industry is only able to operate at 10 to 15 per cent. of capacity. Thus, coal consumption in Cleveland and northern Ohio has been cut almost squarely in two. The coal the iron and steel industry is unable to absorb is going to other users, who are only too glad to get it.

Less and less talk is heard of prices. It seems accepted by all that the present quotations will hold for some time, barring the fluctuations either way that come with the ebb and flow of the market. Car supply and labor continue to bother at the southern and eastern Ohio mines. The Ohio mines are operating from 55 to 60 per cent. of capacity.

Anthracite and Pocahontas—Although receipts of both grades have not increased perceptibly, retail dealers are rapidly catching up with orders and deliveries within two weeks of placement are now being made. The tendency in both grades constantly is upward, and further price advances are threatened.

Lake Trade—Although lake sailors are voting whether they will strike in sympathy with steel mill workmen, no walk-outs have yet occurred. The movement to the lakes continues about one-third of normal. Lake Erie decks are dumping from 1750 to 2300 cars of bituminous coal a day.

DETROIT

Sluggish demand and a narrow market continue prominent features of the bituminous trade in Detroit.

Bituminous—Neither the consumers of steam coal nor the buyers of domestic stock have developed the interest in the market that conditions of the trade would seem to warrant. While the situation in the Detroit market remains on an unsatisfactory basis, jobbers say their customers outside Detroit are calling for coal eagerly and that they have little difficulty in placing all the stock they can get.

Prices are holding rather steady despite the slack demand. Hocking domestic lump is being quoted at the mines on a net-ton basis at \$3.50@3.75; egg is selling at \$3@3.25; mine-run is offered at \$2.25@2.50 and slack at about \$2. Four-inch West Virginia lump brings about \$4, with egg quoted at \$3.50@3.75 and mine-run at \$2.75, while nut, pea and slack ranges from \$2.25 to about \$2.50. Receipts of smokeless are light and prices are somewhat uncertain, though quotations on mine-run are given as approximately \$3.75, with lump around \$5@5.50.

Anthracite—With only small amounts of anthracite in the hands of local retailers and a considerable proportion of the local consumers yet to be supplied the outlook is not altogether cheerful for many of the buyers who have delayed providing for winter needs. The dealers say many will have to accept bituminous as a substitute, unless conditions show greater improvement than now seems possible.

Lake Trade—With shipments over lake routes again approaching normal, following the end of the dock workers' strike, suspension of shipments is threatened by an impending strike of seamen on ore-carrying vessels.

COLUMBUS

The Ohio coal trade is less active than was the case several weeks ago. Steam demand is not as strong as formerly while domestic sizes are still firm.

The chief feature of the coal trade is the demand for domestic sizes, which is holding up extremely well in every locality. Pocahontas, while quite scarce, is coming into the local market. There is a good demand for West Virginia splints and certain Kentucky grades. Hocking lump is

still moving in large quantities and the same is true of Pomeroy Bend coal. Retail prices are firm although the wide range in quotations is passing away. Hocking lump sells at \$5.75@6.25, while Pocahontas is quoted in the neighborhood of \$9.

Steam business is a little slow as the result of fair reserve stocks and uncertainty in the future. Strikes are having their effect on the trade, although Ohio coals are not affected so much as some other varieties. The eastern Ohio field is the most influenced by the steel strike. Steam prices have weakened a little under the influence of reduced demand.

The lake trade is still lively, with the car shortage taken into consideration. Shipments are going forward steadily and every effort is being made to get the required tonnage to the Northwest as early as possible. The lake movement is progressing satisfactorily despite the upper lake strike. Congestion on the upper lake docks is passing away.

CINCINNATI

Prices remain firm. Car supply still hampers output. Domestic demand lacking.

Prices on all kinds of coal being sold by the wholesalers and retailers to the consuming public in the Cincinnati district remain firm and steady with prices tending upward, if anything. The car supply at the mines in the districts supplying Cincinnati and vicinity has not improved to any extent in the past week. Miners in the Ohio field especially continue to complain because they can not get in full time because of car shortage.

Domestic trade at this time is not what the dealers expected it to be. There is not the usual rush, although the prices continue to climb and the supplies continue to grow smaller. Many domestic consumers have installed double heating systems—coal and gas—and intend to use the latter until actually forced to start the coal furnace.

BIRMINGHAM

Demand from commercial trade just about equals production in the district. Domestic trade very active as far as inquiry goes, orders being turned down in most cases account inability of mines to furnish coal.

Current orders and bookings at the mines are sufficient to take the full output at the mines, due to crippled operating conditions, otherwise there would be a surplus supply of steam fuel. Rail lines, in the main, have practically no stocks on hand, and will no doubt be forced to buy coal in the open market in the near future, as contract deliveries are not sufficient to allow any stocking. Quotations on steam coal are holding up well and prices range as follows per net ton mines: Big Seam, \$2.30@2.60; Black Creek and Cahaba, \$3.45@3.86; Pratt, \$2.85@3.00.

The limited supply of domestic coal prohibits the possibility of a runaway market. Domestic producers, with few exceptions, are sticking to the schedule of prices, based on Government schedules adopted Apr. 1 and increasing 10 cents per ton through the month of September.

Coke

CONNELLVILLE

Furnace coke requirements greatly decreased by iron and steel strike and market prices practically nominal. Foundry coke not materially affected.

The iron and steel strike could well have been expected to work complete havoc in the coke trade, and the best that can be said is that the situation is no nearly so bad as it might be. Nearly a week before the date for which the strike was scheduled, Sept. 22, suspension orders began, and while this gave the coke trade notice of what might be expected and lessened the suddenness, there are claims in some quarters that the furnaces that decided in advance to bank might have been able to operate after all. Practically all the Shenango valley furnaces north of New Castle are down, together with all the Mahoning Valley furnaces and the majority of those in the Buffalo district. The scattered western Pennsylvania furnaces are in blast, with an occasional exception. As to the Pittsburgh district proper the Connellsville coke trade may be said not to be affected, since there is scarcely any idleness of furnaces except those that are tributary to the Clairton byproduct plant. It is running somewhat over 50 per cent.,

but is thus drawing less coal than usual from Connellsville.

Operators undertook to operate fewer days per week and eventually to blow out ovens, to restrict production to the requirements, but furnace coke nevertheless became a drag on the market at once, and some lots were offered at sharply cut prices. The general market is regarded as off only about 25c., though it is practically nominal at any price.

Foundry coke has continued in good demand, but if the strike is prolonged for many weeks the demand is likely to be restricted by pig iron supplies of foundries diminishing. Meanwhile foundry coke is approximately as strong as formerly. We quote furnace at \$4.50@4.75 and foundry at \$6@6.50, per net ton at ovens.

Middle Western

GENERAL REVIEW

Domestic coal continues to be in brisk demand. Curious situation in Middle West. Car shortage still troubles operators.

The coal market in the Middle West territory continues in a vigorous state of activity. Domestic coal, as has been the case for the last six or eight weeks, is in very good demand; in fact, the average operator, with an average coal, is at least a month behind on his domestic business. Varying reports come in as to the steam-coal situation. Some of the largest operators and distributors report their surplus steam coals sold at top prices, while others, equally prominent in the trade, say that the steam market has eased up a little since last week. Sales of screenings are reported, so far this week, at from \$1.65 to \$2.25 per ton mines—the price depending not so much on the quality of the coal as on the ability of the producer to find an eager buyer. Some of our largest consumers of steam coal have shown unmistakable signs of panic. They are undoubtedly worrying over the labor situation.

There has developed in the Middle West a rather curious situation. We learn from operators and jobbers who supply the Indiana, Ohio and Michigan retail trade that the average coal dealer is not a bit concerned, and domestic coals are consequently moving rather slowly into these states. Further west, in the Illinois, Iowa, Wisconsin territory, dealers are placing their orders right and left, and bending all their energies toward stocking their customers' and their own yards with a plentiful supply of coal. The situation on steam sizes is exactly opposite. In Illinois, Iowa, Wisconsin and Minnesota the demand, on the whole, for mine-run or screenings is not too strong, while in the Indiana, Ohio and Michigan districts we hear that the demand for steam coal is excellent; in fact, sales of nut, pea and slack from Kentucky and West Virginia are reported as high as \$2.50 to \$2.60, with mine-run from the same districts at from \$2.85 to \$3.25. It is our opinion that the domestic trade in Michigan, say, and the steam trade in Illinois, could well afford to purchase coal a little more heavily. Time will show, and very soon, whether or not our conclusions are correct.

The two big handicaps to the coal industry—the car shortage and labor unrest—continue about the same. Operators on the I. C., the C. & E. I., the Big 4 and a few other railroads are raising their voices to Heaven and Washington, D. C., in vain efforts for relief. One result has been obtained, however, as it is said our popular Director General of Railroads had admitted that there is a car shortage—a thing, we understand, he denies a little while back. The labor unrest in the Illinois field continues, and we hear that the insurgent army of miners are now in Franklin County. The visits of this group of radicals always result in mines being idle for a day or so, but we are told that they have made few converts of late in southern Illinois.

CHICAGO

Large railroad order placed with Indiana mines. Domestic situation strong. Eastern coal hard to get.

Some sizable sales on steam coal have been reported here during the last few days. One railroad that operates exclusively in and about Chicago made a fairly large purchase of coal to be placed in storage, insurance, as it were, against a shortage this winter or a strike in the coal fields this fall. The order referred to was placed with Indiana mines, and was large enough to absorb all loose coal

on the Indiana market, thus strengthening it materially. We are advised that Indiana got the business instead of Illinois because of a 4c. differential in freight in favor of Indiana coal.

The domestic situation in Chicago continues strong and active. Retailers say that the mines are behind on orders for lump, egg and nut, and that some mines are only taking business on a basis of price current at time of shipment. Eastern coal is getting more scarce from day to day, while it is practically impossible to purchase anthracite, although deliveries are being made in a fairly satisfactory measure on old orders.

MILWAUKEE

Coal market continues quiet. Shippers protest advance in freight rates to Southern Wisconsin points. Egg anthracite sold out. Good supply of coke.

The coal market remains quiet. There is a comfortable supply of everything just now, except stove size anthracite, which is out of the market. Prices continue without change. Coke moves slowly, with large stocks on hand. The reserve coke supply may come in handy should a prolonged strike in the iron industry paralyze the coal movement up the lakes. Lack of rolling stock checks shipments to the interior. This condition is liable to continue because of the grain movement. Things are dull along the docks, with few vessels under the hoists. Receipts thus far this season aggregate 617,154 tons of anthracite and 2,208,108 tons of soft coal, a gain of 165,617 tons of the former and a loss of 299,641 tons compared with the record of last year during the same period.

Coal rates from Milwaukee to Southern Wisconsin points have been increased 10 to 30c. per ton by the Federal Fuel Administration, and the Wisconsin Railway Commission has filed a protest and requested a rehearing. The change will be to the advantage of Illinois coal producers. The increase to Whitewater, Lima Center, Milton, Milton Junction, London and Deerfield is 30c. per ton, and to Edgerton, Cottage Grove, Mendota and Waunakee 20c. per ton. To 19 other points the increase is 10c. per ton.

ST. LOUIS

A quiet and easy market continues with no surplus coal and nothing unusual in the way of demand. Country call is good for domestic and easy for steam.

The situation locally continues much as it has been for the past few weeks, with no surplus coal from any of the fields and no unusual demand for anything but high-grade fuel.

The standard market is far better on country coal than on St. Louis coal. For that reason as much coal from the Standard field as can be shipped is sent outside. Six-inch lump, 3 x 6 egg and 2 x 3 nut is bringing from \$2.75@3 a ton. Two-inch lump is bringing from \$2.50@2.75, and screenings are from \$1.50@1.75, with mine-run at about \$2.25. In the city this coal is selling for about \$2.50@2.75 for the domestic sizes, with screenings at about \$1.25 and mine run at about \$2.

The railroad tonnage is extremely heavy from this field at this time on account of the scarcity of cars and the scarcity of coal in Kansas and in the southwestern fields. The Northwest is also drawing heavily on the railroad coal, but this is coming chiefly from the Mt. Olive district.

More Mt. Olive coal of the domestic sizes is moving into St. Louis than has moved in at any previous time in several years. This is on account of the price being maintained the same as it was all summer; namely, about \$2.40 for 3-in. lump and up to \$2.50 and \$2.75 for the other domestic sizes. A heavy tonnage of this is moving to the Kansas City, Omaha and Chicago markets. The outside price is from \$2.85@3 for domestic sizes.

Nearly all of the steam sizes from this territory are under contract.

The situation in the Cartersville field of Williamson and Franklin Counties is not changed. The chief trouble is car shortage. There has been a little labor trouble in one or two places in the Franklin County field, but this has been fixed up and if it were not for the car shortage a record-breaking tonnage would result. As it is, the mines on some roads are working but two or three days a week. Three days a week is considered good working time. The Missouri Pacific and Illinois Central are in a somewhat better shape than they were, but are still far from being anywhere near satisfactory. The only thing that is a little easy is screenings from one or two mines. Other than that the field is oversold for several weeks. There is no chance of getting caught up.